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THE LANCET

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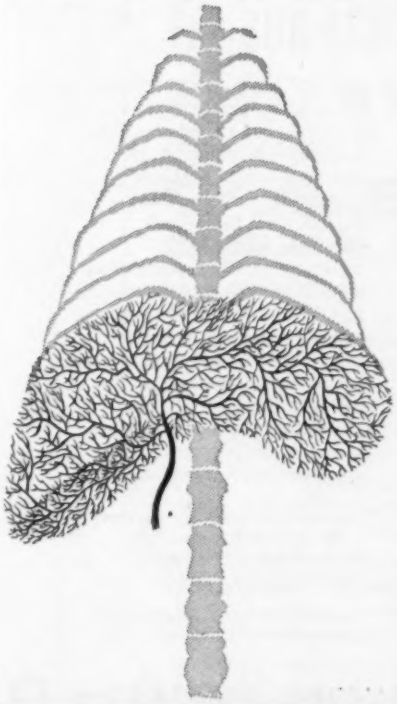

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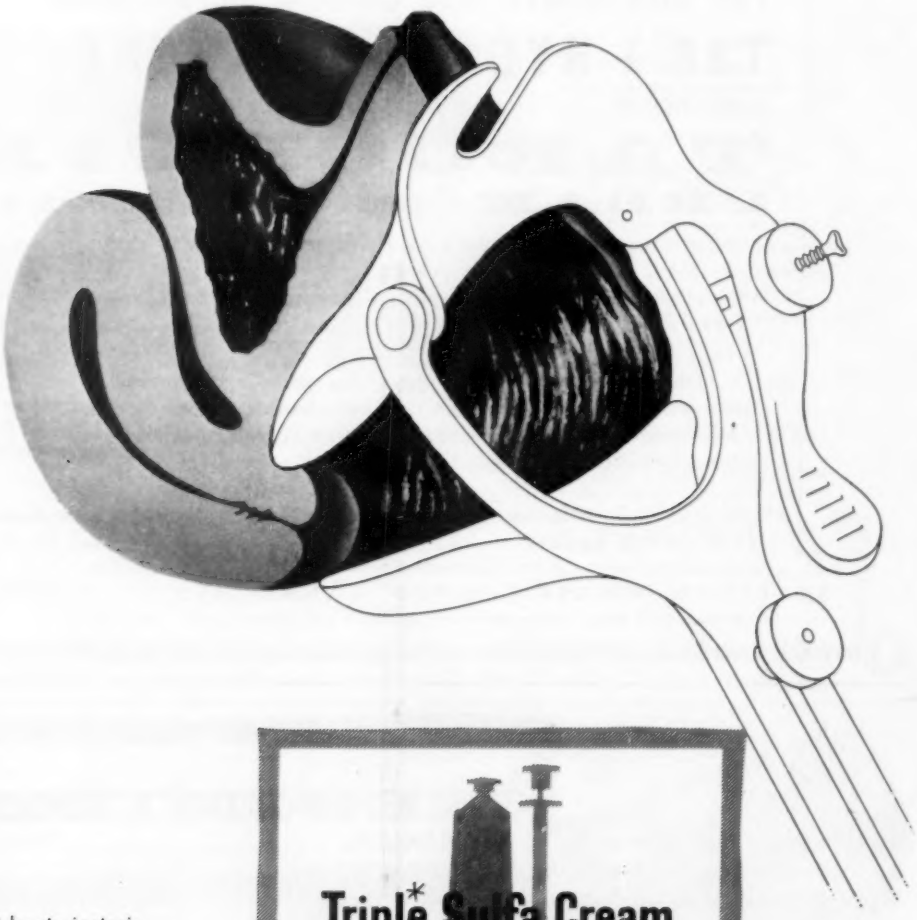

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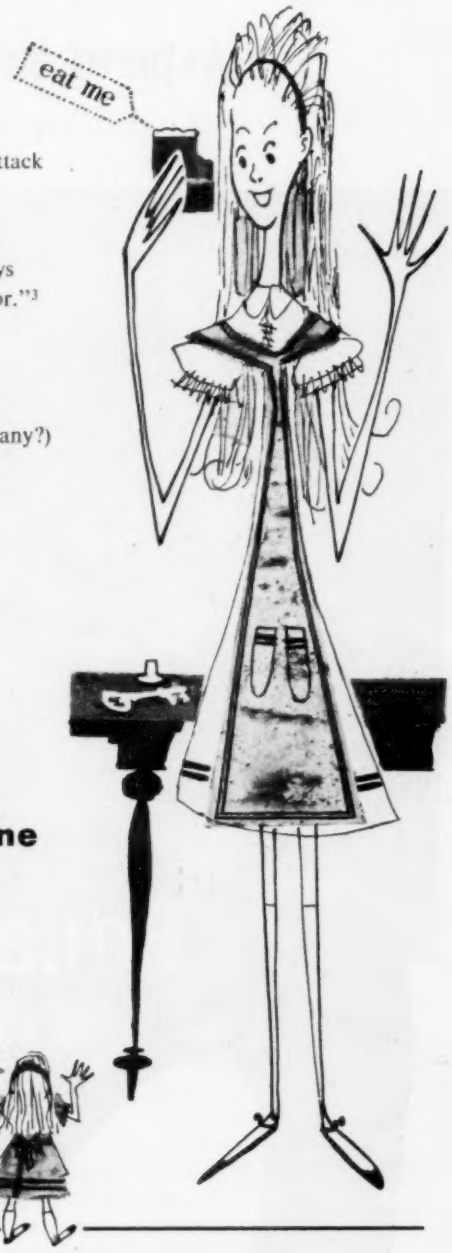
[1] *J. nerv. ment. Dis.* (1952) **116**, 346 [2] *Lancet* (1956) **1**, 794
[3] *Canad. med. Ass. J.* (1955) **73**, 701



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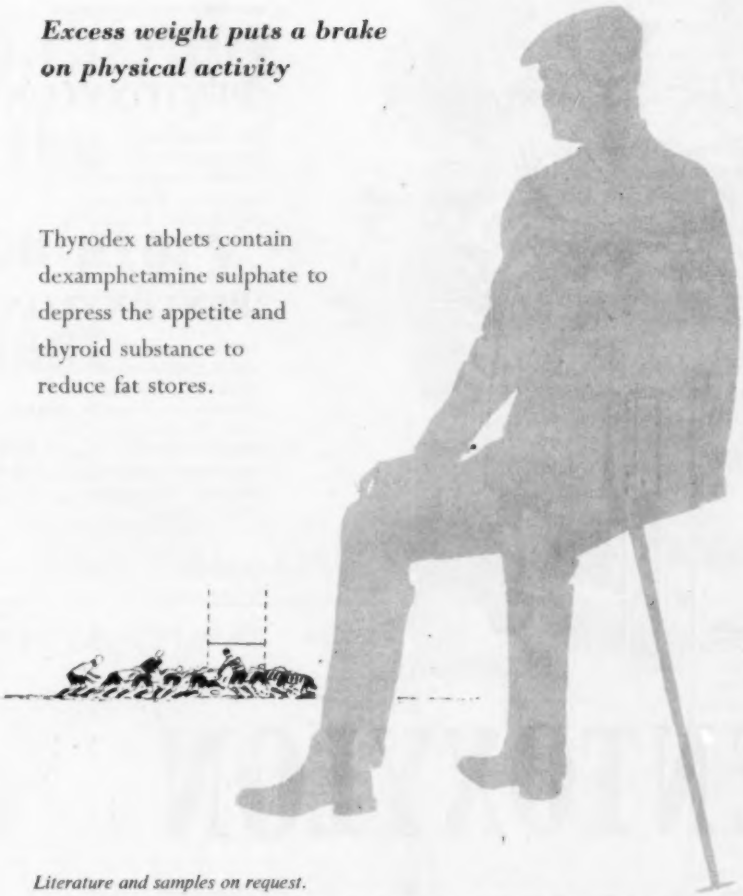

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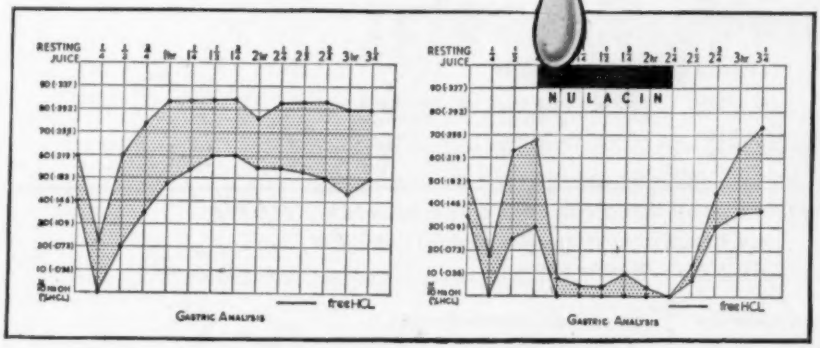
Control of Gastric Acidity by a New Way of Antacid Administration. *J. Lab. & Clin. Med.*, 1953, **42:** 955

The Effect on Gastric Acidity of "Nulacin" Tablets. *Med. J. Aust.*, 28th November 1953, **2:** 823-824



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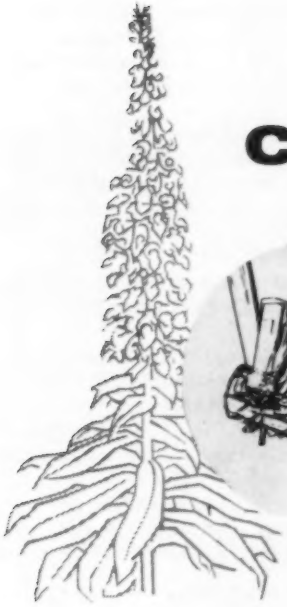

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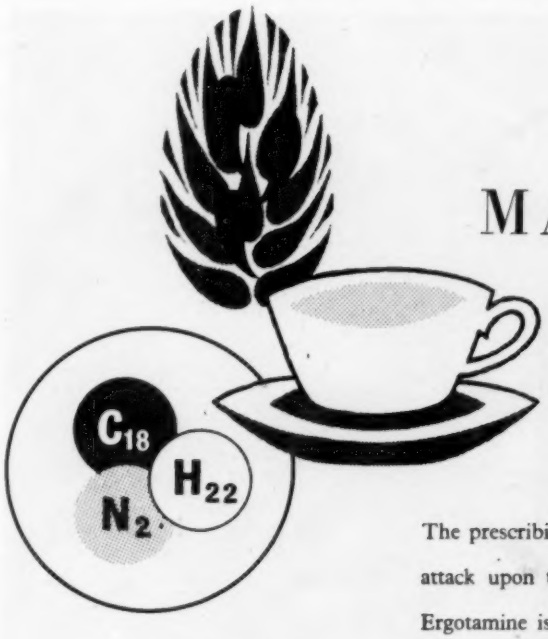

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GLANDULAR TOXOPLASMOSIS
A SURVEY OF 30 CASES

J. K. A. BEVERLEY
M.D. B.Sc. Sheff.,
LECTURER IN BACTERIOLOGY

C. P. BEATTIE
M.A., M.B. Edin., D.P.H.
PROFESSOR OF BACTERIOLOGY

UNIVERSITY OF SHEFFIELD

IF the results of toxoplasma antibody surveys are to be believed—and there is at present no valid reason to doubt them (Cathie 1957, Feldman and Miller 1956)—subclinical toxoplasma infection is common in this country, as in others. A recent survey in Lincolnshire (Beattie 1957) showed that 36% of country-dwellers and 22% of town-dwellers had cytoplasm-modifying (dye test) antibodies (Sabin and Feldman 1948) to a titre of 1/16 or more.

By contrast, clinical manifestations of toxoplasma infection appear to be uncommon; but perhaps they are not so uncommon as is often thought.

In the two toxoplasma reference laboratories in London and Sheffield in 1950–56 congenital toxoplasmosis was diagnosed by serological and in some cases animal-inoculation methods in 110 cases; and probably many more went undiagnosed (Beattie 1957). Moreover it is estimated that from 20% to 35% of choroidoretinitis is due to toxoplasma infection, mostly congenital (Smith and Ashton 1955, Jacobs et al. 1956, Perkins and Beverley 1958).

Infection cannot all be congenital. Nor would one expect that the manifestations of acquired infection should always, as in the earlier reports, be severe. For these reasons Siim (1951) looked for evidence of toxoplasma infection in patients with fever of unknown origin. He found it, as did Gard and Magnusson (1951) and von Zeipel and Linder (1951), in patients with lymphadenopathy resembling "glandular fever". These results were confirmed in this country by Skipper, Beverley, and Beattie (1954), by Cathie (1954 a and b), and by Bateman (1957). In Denmark Siim (1956a) has encountered over a hundred such cases. He estimates that toxoplasmosis accounts for about 5% of cases of lymphadenopathy of unknown origin. In our experience it accounts for about 7% of cases clinically diagnosed as "glandular fever" but giving a negative Paul-Bunnell reaction.

The Present Series

The purpose of this paper is to direct attention to this glandular form of toxoplasmosis, which appears to be the commonest manifestation of acquired infection. Thirty cases are prescribed in summary form (table I), and the results of antibody studies on the relatives of some of the patients are shown (table II). Some of the cases have been reported already and others will be reported more fully elsewhere.

Discussion

It may well be asked how a diagnosis of toxoplasmosis can be made and on what basis the cases were selected for this report. Isolation of the parasite by animal inoculation is the most trustworthy method.

In cases 7, 11, 14, and 19 the diagnosis was confirmed by inoculation of ground-up gland material into mice. In cases 24, 25, and 29, this failed. Toxoplasms have been isolated by other workers from muscle taken by biopsy, from tonsils, from blood, and from saliva. We failed to isolate toxoplasms from the tonsils of patient 18, but the attempt was made 8 months after the start of her illness; and we also failed to isolate the parasites from the blood or saliva of patients 19 and 20. It should be noted that, as in the present instances, toxoplasms from man often prove of low virulence for, and fail to produce obvious illness in, laboratory animals; yet toxoplasma cysts may be found in their brains a month or more after inoculation.

Rarely is it possible to make the diagnosis by demonstrating the parasite in excised lymph-glands. Indeed this has only once been done with certainty, when Stanton and Pinkerton (1953) after long search found one cyst. This is the only form which can be definitely identified in tissue sections. Nor can the histological picture establish the diagnosis, though it may suggest it.

The morphological changes in lymph-nodes have been described by Stanton and Pinkerton (1953), Siim (1952), Lelong et al. (1954), and Bang (1957). From these accounts it might appear that there is little agreement as to the actual microscopical changes, but this is probably due more to lack of unanimity in nomenclature than to true histological differences. In most cases there is a reactive hyperplasia with scattered foci of histiocytic or epithelioid cells.

Robb-Smith kindly examined sections of glands from some of the patients in this series and reported that those from patients 10, 11, 15, 17, 19, 21, 22, 23, and 24 correspond with his description of "lymphohistiocytic medullary reticulosis" (Robb-Smith 1947). The glands from patients 7 and 25 were not so typical of this. He found a similar appearance in sections of lymph-glands submitted to him by Siim and Bang, who described the change (1957) as a focal medullary reticulosis. The reaction, although characteristic, is not specific. Robb-Smith has found it in kala-azar and in many cases of unexplained ætiology which until recently were not investigated serologically for evidence of toxoplasmosis. It is distinct from the appearances found in infectious mononucleosis with a positive Paul-Bunnell reaction. Recently sera from six patients have been sent to us for serological tests for toxoplasmosis because a histological diagnosis of lymphohistiocytic medullary reticulosis had previously been made. Two of them proved strongly positive (cases 10 and 15). A third was very suggestive (dye test 1/256 but negative complement-fixation test), while the remaining three gave only low titres.

As animal-inoculation methods are not always possible or successful, the diagnosis must often rest on serological tests. Those now in use are the complement-fixation test and the cytoplasm-modifying (dye) test. An important but difficult question is what titres should be taken to signify active infection.

One answer would be to accept titres above those found in the normal population. We have recently found (unpublished) that only 2 out of 1357 adult blood-donors had dye-test titres of 1/256 or more. That titre, in the presence of a clinical picture compatible with toxoplasmosis, might be accepted. Another answer would be to accept titres comparable to those found in persons from whom toxoplasms were isolated. In the present series that would mean dye-test titres of 1/1000 or more, and indeed in twenty-five of the cases here reported the titres are, or are nearly, of this order. On the other hand Jacobs et al. (1954) isolated toxoplasma from the eye of a patient whose dye-test titre before enucleation was 1/64, Prior et al. (1953) from the blood of a healthy young woman (owner of a toxoplasma-infected dog) whose dye-test titre was 1/160, and we ourselves (unpublished) from the ventricular fluid of a baby whose dye-test titre was 1/170 and whose complement-fixation titre was less than 1/5. Sabin et al. (1952) suggest that for proof of active infection the dye-test titre should increase eightfold or more to at least 1/256 and be maintained at or near that level for several weeks. During this time

the level of the complement-fixing antibody should either change from negative to positive and rise to a titre of 1/8, or, if positive initially, should subsequently increase at least four-fold. A rise in titre is of great value, but repeat specimens cannot always be obtained. Moreover the antibody titre may be at its highest when the first specimen is taken.

For this report we have adopted an arbitrary level of a dye-test titre of 1/256 and a complement-fixation titre of 1/10. This does not prove toxoplasmosis but makes it very highly probable. We have departed from this in only two cases—in case 2 because the rise in dye-test titre seems to justify inclusion and in case 4 because the dye-test titre was 1/875 though the complement-fixation titre was only 1/4. The titres chosen have meant the regretted omission of numerous other cases believed to be toxoplasmosis, some of which will be mentioned later.

It should be noted that titres may not reach the arbitrary level till some time after the onset of symptoms. After laboratory accidents, when the development of toxoplasmosis was expected and the onset of symptoms looked for, the interval has been 1–4 weeks.

It was hoped that a study of the case-records would show characteristic features which would enable glandular toxoplasmosis to be diagnosed clinically, but it has not done so. The diagnoses considered by the attending physicians were varied. Most common was infectious mononucleosis. Others were tonsillitis, Hodgkin's disease, mumps, lymphosarcoma, leukæmia, aleukæmic leukæmia, and poliomyelitis.

In their nature and variety the signs and symptoms resemble these of infectious mononucleosis. Only one thing stands out. None of the patients' sera gave a positive Paul-Bunnell reaction. This has also been the experience of Siim (1956a).

As with infectious mononucleosis, the incidence is mainly in children and young adults. Ten of the patients were under the age of 10, eleven from 11 to 20, four from 20 to 30, and five over 30. This predominance in the young is in keeping with the results of serological surveys (Beverley et al. 1954) which show that in this country the frequency of toxoplasma antibodies rises to the age of 20 and thereafter changes little.

The illness varied enormously in severity and duration. Five of the patients (7, 10, 12, 13, and 17) were never

TABLE I—SUMMARY OF THE CASES

Case no.	Sex and age	Date of onset	Fever	Sore throat	En-larged spleen	Enlarged glands and other points of interest	Illness (weeks)	Leucocytes	Lymphocytes	Date	Dye test	C.F.T.	Animal contact
1	M 3	10.xii.56	Yes	No	No	Tonsillar, neck, axillæ, groins; not tender. Photophobia	3	11,500	5200	21.xii.56 22.i.57	1/900 1/900	1/10 1/40	Cats, dogs, rats, budgerigar
2	M 3	xi.56	..	Sl.	No	6 months' recurrent, enlargement of parotids. Tonsillitis. Recovered, then relapse of neck swellings	..	15,000	..	12.iv.57 19.vii.57	1/14 1/320	<1/5 <1/5	..
3	M 5	25.xi.56	Yes	Yes	Yes also liver	Neck, supraclavicular, axillary, inguinal; neck painful. Also tonsillitis	4	19,500	11,500	13.xii.56 21.xii.56 23.i.57 20.iii.57	1/200 1/160 1/500 1/55	<1/5 1/10 1/5 <1/5	Cats, dog, rats, mice, budgerigar
4	M 5	11.xi.55	..	Yes	..	Neck. Sore throat, vomiting	1	6800	..	25.xi.55	1/875	1/4	..
5	M 6	14.xii.56	Sl.	Yes	No	Neck, axillæ, groins, preceded by sore throat	3	8000	4080	1.ii.57 12.iv.57	1/340 1/1000	1/10 1/40	None at home
6	F 6	24.i.53	Sl.	..	..	Neck and groin. Preceded by "influenza" and bronchial catarrh	7	12,500	4500	18.ii.53 13.iii.53	1/360 1/150	1/16 1/8	..
7*	M 7	18.x.55	No	No	Yes	Neck, axilla, groins. Did not feel ill. 5 weeks before doctor consulted	8	6800	3260	9.xi.55 1.iii.56	1/560 1/1200	1/5 1/20	Cats
8	M 8	20.vi.55	..	No	No	Anterior and posterior triangles of neck, and hilar. Tired	8	8900	3000	23.vii.55 11.viii.55 24.xi.55	1/125 1/1250 1/1800	1/16 1/24 1/40	None at home
9	M 8	8.i.57	Yes	..	Yes	Neck, especially submandibular; soft and discrete. Preceded by malaise and fever	4	16,000	8800	2.ii.57 19.ii.57 18.iv.57	1/320 1/340 1/85	<1/5 1/10 1/20	Cat
10	F 9	x.57	No	No	No	Neck, axillæ, groins, chest wall. Not tender. Size from pea to egg. Did not feel ill	..	5000	Normal	15.i.58	1/3200	1/80	..
11*	M 11	11.i.55	Yes	..	..	Axilla, chest. Fever at start. 4 weeks before doctor consulted	8	6300	3100	18.iii.55	1/1600	1/8	Domestic and farm
12‡	M 11	11.iii.55	No	No	No	Right axilla and below right breast. Rubbery. Not tender. Did not appear ill	3	9700	..	25.iii.55 28.iv.55 12.i.56	1/820 1/256 1/38	1/8 1/16 <1/5	Dog
13	M 14	x.56	No	No	No	Occipital only. Did not feel ill	..	7200	No l'cytosis	4.v.57	1/4800	1/80	Mice
14*	F 14	1.xi.57	..	No	Yes	Post- and pre-auricular; occipital, shotty. 4 weeks before doctor consulted	2	7200	4320	13.ii.57 20.xii.57 23.iv.58	1/17,000 1/32,000 1/2800	1/40 1/20 1/80	Budgerigar sick May to Sept.; also dog and cat
15	F 14	ix.56	No	No	No	Occipital and cervical; smooth, painless, freely movable. Throat infection 3 months before	..	5500	2250	1.vi.57	1/10,000	1/80	Pet bird
16	M 15	ii.57	No	No	No	Occipital, axillæ and groins; firm and discrete. 2 months before doctor consulted	..	6850	2945	5.vii.57 7.ix.57	1/7000 1/4000	1/40 1/20	Dog ill with "twitchings" Jan. 1957
17	M 16	18.x.54	No	No	No	Neck, axilla. 2 weeks before doctor consulted. Never really ill	..	7200	3310	11.i.55 5.iii.55	1/3000 1/3500	1/80 1/32	Cat

really ill, and one (30) admitted to no more than having felt "off colour". The shortest duration was 1 week (patient 4) and the longest at least 44 weeks (patient 25). In general, adults and adolescents were more severely affected than children.

Among the first things noticed by twenty of the thirty patients, or by their parents, was swelling or pain in lymph-glands, usually in the neck. In five cases (7, 11, 14, 16, 17) so little account was taken of this that 2–8 weeks passed before a doctor was consulted.

Any group of neck glands may be affected. Sometimes the enlargement was unilateral and sometimes bilateral. In addition to glands in the neck, the axillary and inguinal glands were usually enlarged, and in three patients glands in the chest wall. In one patient (8) X-ray examination revealed enlargement of hilar glands. The size of the glands varied from 1 to 6 cm. Some were soft, some rubbery, and some hard. They were discrete and not attached to the skin. In five patients (3, 8, 22, 24, 25) they were tender; patient 3 cried with pain; and the first symptom noted by patient 19 was glandular aching. But in most cases tenderness, if present, was slight. The glands as a rule took a long time, sometimes many months, to return to normal size.

Sore throat was not a prominent symptom. It was noted at the start in seven patients and developed later in three others. Other first symptoms were headache, fatigue, depression, and muscle pain. None of the patients had a high fever and eleven were afebrile. The spleen was enlarged in five patients in two of whom the liver was also enlarged. Siim (1956a) states that the spleen is seldom palpable.

The patient whose initial symptom was headache (24) had also pain in the back and neck which led to a suspicion of poliomyelitis. Three others developed headache during their illness (20, 25, 26), and patient 26 was suspected of having meningismus. Here, perhaps, may be seen a transitional stage towards the rare severe cases of toxoplasmic encephalitis.

Pain in the joints and limbs was experienced by three patients (19, 24, and 25) and has been observed by Stanton and Pinkerton (1953) and by Garin (1953).

Abdominal pain was present in three (19, 23, 25), from one of whom (19) an apparently normal appendix was removed. It seems possible that toxoplasmosis may cause mesenteric adenitis.

TABLE I—*continued*

Case no.	Sex and age	Date of onset	Fever	Sore throat	Enlarged spleen	Enlarged glands and other points of interest	Illness (weeks)	Leucocytes	Lymphocytes	Date	Dye test	C.F.T.	Animal contact
18	F 18	iv.56	Sl.	Yes	..	Tonsillar and cervical. Little constitutional upset	..	9200	..	26.vi.56	1/960	1/80	Farm animals
19*	F 17	14.xi.56	Yes	Yes	No	Submental, anterior border of sternomastoid, posterior triangle of neck, groin. All on right. Ached at first. Later tender. Discrete except at the anterior border of sternomastoid. Overlying skin not involved. Shoulder, leg, and abdominal pain. Appendicectomy. Tired	22	8000	2900	24.x.56 30.x.56 14.xi.56 21.xi.56 26.xii.56 9.i.57 16.ii.57 10.v.57 4.xi.57 31.iii.58	1/44,000 1/50,000 1/32,000 1/17,000 1/9000 1/8200 1/7000 1/1100 1/320 1/340	1/10 1/20 1/40 1/20 1/5 1/5 1/10 <1/5 <1/5 <1/5	Dogs and hens
20	F 19	24.xii.54	Sl.	Sl.	No	Neck, axillæ, skull; headache, nausea, depression, fatigue	28	7200	3200	8.ii.55 8.iii.55 5.vii.55	1/226 1/900 1/500	1/8 1/32 1/14	Cats and farm animals
21	M 19	1.ii.56	No	No	No	Neck. Swelling of upper gum, small ulcers in lower lip. No general upset	8	8000	2500	14.iii.56 7.v.56	1/1000 1/6000	1/5 1/40	Much with dogs
22	F 21	20.vi.56	No	No	No	Neck. Firm, slightly tender. Tired, irritable, ambulant	4	6000	..	10.viii.56 14.ix.56	1/400 1/3000	1/2 1/10	Cats
23†	M 21	6.x.54	Yes	Yes	Yes	Right side of neck, axillæ, groins; rubbery, not tender. Sore throat, abdominal discomfort, tachycardia	24	9600	2600	9.ii.55 17.iii.55 17.ii.56	1/256 1/3200 1/400	1/64 1/32 <1/5	Dogs
24†	F 26	10.viii.56	Sl. 1 day	Slight after second admission	No	Left occipital, right cervical, right axillary, right inguinal, supraclavicular; discrete, firm, tender. First admitted for headache and back pain. Glands enlarged after discharge. Readmitted	16	8200	3450	17.viii.56 23.viii.56 22.xi.56 13.xii.56 13.xii.57	1/77 1/102 1/4600 1/12,000 1/850	.. 1/5 1/20 1/20 <1/5	Dogs and farm animals
25	M 27	14.iii.56	Sl.	Sl.	No	Cervical, axillary, inguinal. Tender in left groin. Severe lumbar pain, also pain in axilla, chest, back, groin, and abdomen; slight cough, stiffness of right wrist and hand. Relapse in Jan., 1957. Prolonged fatigue	44	10,800	4300	26.iv.56 16.v.56 31.v.56 8.xi.56 2.ii.57	1/1000 1/1000 1/730 1/175 1/270	1/5 1/10 1/5 <1/5 <1/5	Horses and dogs
26	M 30	3.xi.55	Yes	Yes	No	Cervical and postauricular. Severe headache. Prolonged fatigue	40	10,000	5000	11.viii.55 17.xii.55 23.ii.56	1/2000 1/10,200 1/7800	1/64 1/40 1/80	Dogs
27	F 32	i.57	Yes	Yes	..	Left posterior cervical	..	9600	..	4.iv.57	1/400	1/10	Budgerigar
28	F 36	31.xi.56	..	Yes	No	Neck; hard and shotty. Preceded by sore throat	10	7700	3500	28.xii.56	1/1100	<1/5	..
29	F 50	ii.54	No	No	No	Neck. Weakness and shortness of breath	26	10,000	7000	22.iv.54 30.iv.54	1/1170 1/5100	.. 1/16	None
30	F 50	i.55	No	No	No	Axillary, not noticed by patient. "Off colour." Mother of patient 19	..	..	..	18.ii.55 22.iii.55	1/820 1/560	1/16 1/64	Cats and farm animals

* Toxoplasma recovered from gland by mouse inoculation. † Reported in greater detail by Beverley et al. (1958). ‡ Reported in greater detail by Paton et al. (1958).
C.F.T. = complement-fixation test. Sl. = slight.

One patient, not included in this list because, although her dye-test titre was 1/280, her complement-fixation titre was >1/5, had enlarged mesenteric glands 7 months before the enlargement of glands in neck. Another had for 2½ years recurrent attacks of pain in the right iliac fossa diagnosed as recurrent mesenteric adenitis or subacute appendicitis. A normal appendix was removed but the mesenteric glands were found to be enlarged. A month before operation his dye-test titre was 1/540 and his complement-fixation titre 1/80. 4 months after operation the results were 1/900 and 1/20. He too has been excluded from the list because confirmation by isolation of the parasite is thought necessary before accepting toxoplasmosis as a cause of mesenteric adenitis unassociated with lymphadenopathy elsewhere.

Joseph et al. (1957) isolated toxoplasma from an axillary gland of a patient who had mesenteric adenitis, but failed to isolate it from the mesenteric glands of twenty-two others, two of whom had serological reactions indicating recent toxoplasma infection. More recently Desmonts (1958) examined the serum of a child who was operated on for appendicitis and found to have mesenteric adenitis. The results on a specimen taken 5 days after operation were: dye test, 1/100; complement-fixation test, negative. 3 weeks later the titres had risen to: dye test, 1/2500; complement-fixation test 1/100.

Reid and Manning (1956) noted symptoms attributable to mesenteric adenitis in three of their thirteen patients, and in both of Pinkerton and Henderson's (1941) fatal cases of typhus-like toxoplasmosis the mesenteric glands were enlarged. Makstenieks and Verlinde (1957) isolated toxoplasms from the mesenteric glands of inoculated monkeys.

Fatigue was common and in some cases long-continued. Possibly this may be due to infection of the musculature, for toxoplasms have been demonstrated in, or isolated from, muscle tissue (Kass et al. 1952, Couvreur 1955, Siim 1956b, Kayhoe et al. 1957).

The blood-picture showed an absolute leucocytosis in six patients, while five others, adults, had leucocyte-counts of between 9000 and 10,000 per c.mm. Lymphocytosis (under 5 years, >6000, over 5 years >3000) was found in fifteen patients. In most it was slight and the highest figure recorded was 11,500 per c.mm. Cells of "glandular fever" type were reported in six patients (4, 14, 19, 22, 27, and 28) while atypical cells not typical of glandular fever were reported in patient 21. A high eosinophilia, 3150 per c.mm., was found in only one patient (2). Patients 1, 5, 6, and 25 had eosinophil-counts of from 400 to 700. Of these patients no. 1 suffered from asthma and infantile eczema. From only one of the patients (19) was bone-marrow taken for examination. The hæmatological report on this was that it was normal apart from apparent "glandular fever" cells, but of considerable interest was the discovery of bodies morphologically resembling toxoplasma. Unfortunately no bone-marrow was left for mouse inoculation and, as the patient had experienced considerable pain, it was not thought justifiable to repeat the marrow puncture. This is to be reported in greater detail elsewhere.

In none of the patients was a rash reported, but patient 25, 2 days after he took ill, had a red elevated irregular area on the skin of the outer surface of his left leg. In two other probable cases (not included) a rash was found.

One was of a boy aged 12 who, besides glandular enlargement, had a discrete, papular, erythematous rash, at first over the body and later confined to the trunk. His dye-test titre was 1/190 and his complement-fixation titre 1/16. The other was of a man aged 21 who had a sparse macular rash on the trunk. His axillary, inguinal, and posterior cervical glands were enlarged, he had a lymphocytosis, and atypical mononuclear cells were found in his blood. His dye-test titre was 1/160 and his complement-fixation titre 1/10. The Paul-Bunnell reaction was negative in both cases.

Only one of the patients (25) had pulmonary symptoms. They were slight cough and sharp pain in the left lower chest, accentuated by deep breathing. In another (8) enlarged hilar glands were found on X-ray examination.

No serious sequelæ were observed in the present series, but Wising (1952) and Kayhoe et al. (1957) reported choroidoretinitis, and one of Strom's (1951) patients developed myocarditis, meningeal irritation, and encephalitis. The second patient of Kayhoe et al. had increased protein and cells in the cerebrospinal fluid. There is also a possibility, suggested by Finckh (1954) and by Siim (1956a), that malignant changes may take place in the glands.

A particular danger is the development of toxoplasmosis during pregnancy, because the infection may be passed to the fœtus. As a rule the mother's infection passes unnoticed, but Couvreur (1955) on careful inquiry found evidence of illness in seventeen of twenty mothers. In seven it was asthenia and in six lymphadenopathy. Farquhar (1950) also noted lymphadenopathy in a woman who gave birth to a child with congenital toxoplasmosis, and Alexander and Callister (1955) and Siim (1956b) have found toxoplasms in both mother and child.

The remedy found most effective, so far, in trials on animals is a combination of sulphadimidine and pyrimethamine (Eyles 1956, Beverley and Fry 1957). Jacobs et al. (1956) and Perkins et al. (1956) found this of some value in toxoplasmic uveitis, and Wettingfield et al. (1956) and Kayhoe et al. (1957) in toxoplasmosis with glandular enlargement. Only one patient in this series (19) was treated with this combination. During treatment her temperature fell but her illness persisted.

An important question, to which there is as yet no satisfactory answer, concerns the source of human toxoplasmosis. Animals have often been suspected and toxoplasmosis has been found in patients closely associated with infected dogs, cats, and rabbits. In the present series patient 21 had much contact with 7 guard dogs, 3 of which had dye-test titres of over 1/160. No illness, however, had been noted in the dogs nor did their handlers have high titres. Patient 23 was a veterinary student and exposed to particular risk because he had examined toxoplasma-infected dogs post mortem. Patient 25 was a carter and had previously kept greyhounds. No toxoplasma antibodies were found in the blood of his horse nor in others that he handled. Twelve of the patients had contact, in some cases close, with cats.

Cats associated with patient 1 had dye-test titres of 1/400 and 1/70, with patient 3 of 1/70, 1/9, 1/5, 1/25, and 1/160, with patient 17 of 1/128, and with patient 23 of 1/85 and 1/95. Toxoplasms were isolated from brain of the cat with a dye-test titre of 1/160. It was not attempted in the cats with dye-test titres of less than 1/50 and failed in the others. Jones et al. (1957) isolated toxoplasms from 50% of cats with titres of 1/64 or higher.

Five of the patients had contact with budgerigars.

Patient 14 had as her personal pet a bird which had been sick with vomiting on several occasions from May to September. The husband of patient 27 bred budgerigars. The birds in contact with patients 1 and 3 did not, however, have detectable antibodies to toxoplasma.

In several instances members of a patient's family were also examined for antibodies. This yielded interesting results, which are shown in table II. In the case of patients 1, 9, 13, 16, 19, 23, 25, and 26 the relatives had either no antibodies or low-titre antibodies believed to be the legacy

of subclinical infection years before. Relatives of patients 2, 5, 12, and 20 appear, however, to have been infected about the same time as the patient. On retrospective examination glandular enlargement was found in the mother of patient 20 and a brother of patient 12. In the other instances there was no history of recent illness nor were there enlarged glands. It is already obvious, from antibody surveys, that sub-clinical infection must be much more common than clinical.

Infection in these instances might have been from a common source, might have been from the patient, or might have been from one of his subclinically infected relatives. There is as yet no definite evidence of man-to-man transmission. Cathie (1954b), however, not only suggested this, but also a possible means of transmission, when he isolated the parasite from the saliva of a child. Jacobsson (1953) reported that a father developed a febrile illness a fortnight after the onset of lymphadenopathy in his son. Several of Siim's (1951) cases were in members of the same family or in playmates. In the present series patient 12 and his 8-year-old brother slept in the same bed. Against the theory of human transmission it must, however, be stated that the incidence of positive serological reactions in husbands and wives is no different from what would be determined by the laws of chance.

Until more is known it must be assumed that human infection may come from a variety of birds and mammals, including man. Toxoplasma has been found in the urine, fæces, and saliva of animals and in the saliva of man. Infection might be by direct contamination, by contamination of food, or by consumption of uncooked meat. It is very unlikely that consumption of cooked meat could produce infection or even give rise to the production of antibodies, for Rawal (1957) found no difference in the incidence of toxoplasma antibodies in vegetarian Hindus and in meat-eating Christians and Moslems. Transmission by an insect vector cannot be ruled out, but many attempts to prove it have failed.

TABLE II—ANTIBODY TESTS ON MEMBERS OF PATIENTS' FAMILIES

	Dye test	Complement-fixation test
Patient 1	1/900	1/40
Father	1/46	<1/5
Mother	1/100	1/5
8 other relatives in close contact—all negative except for one with dye-test titre of 1/46.		
Patient 2	1/500	1/5
Father	1/80	<1/5
Mother	1/76	<1/5
Brother, 13 yrs.	1/24	<1/5
Sister, 7 yrs.	1/880	1/5
Brother, 3 yrs.	1/1600	1/10
Brother, 2 yrs.	1/5000	1/40
Patient 5	1/1000	1/40
Mother	<1/4	<1/5
Brother, 7 yrs.	1/320	1/40
Patient 9	1/340	1/10
Father	1/94	<1/5
Mother	1/80	1/5
2 sisters	<1/8	<1/5
Patient 12	1/820	1/8
Brother, 8 yrs.	1/200	1/5
(tested 10 months after illness of patient 12)		
8 other members of household	<1/16	<1/5
Patient 13	1/4800	1/80
Mother	1/160	<1/5
Father and 2 sisters	<1/4	<1/5
Patient 16	1/4000	1/20
Mother	1/8	A.C.
Sister	1/5	<1/5
Patient 19	1/50,000	1/20
Father	1/92	<1/5
Mother	<1/4	<1/5
Patient 20	1/900	1/32
Father	1/56	<1/5
Mother (case 29)	1/820	1/16
Brother	1/4	<1/5
Patient 23	1/3200	1/32
Mother	1/40	1/10
Father, 2 brothers, and 1 sister	<1/32	<1/5
Patient 25	1/1000	1/10
Wife	1/15	<1/5
3 children, 1 born while patient was ill	<1/4	<1/5
Patient 26	1/10,200	1/40
Wife	1/47	<1/5
Baby born while patient was ill	1/76	<1/5 (passive transfer)

A.C. = anticomplementary.

Lymphadenopathy appears to be the commonest manifestation of acquired toxoplasmosis. There may be other minor manifestations—perhaps some of the febrile episodes so common in childhood.

This is suggested by the finding of high-titre antibodies (dye test 1/1000, complement-fixation test 1/40) in a boy of 2 years (Radcliffe Infirmary no. 219832) who developed a few days of fever after a fall. He had no glandular enlargement. His brother, aged 5, tested nine months later had a dye-test titre of 1/130 and a complement-fixation titre of 1/5. He had not been ill. Significant titres were not obtained on serum from the father and mother.

Since the commonest manifestation of acquired toxoplasmosis so far recognised is lymphadenopathy which usually begins in the neck, it is tempting to think that infection takes place through the mucous membrane of the tonsillo-pharyngeal region.

Summary

Thirty cases of acquired toxoplasmosis resembling glandular fever are reported. Four were proved by the isolation of the parasite. The others had dye-test antibody titres of from 1/320 to 1/50,000 and complement-fixing titres from >1/5 to 1/80. All had negative Paul-Bunnell reactions.

Ten of the patients were under the age of 10, eleven from 11 to 20, four from 20 to 30, and five over 30.

Lymphocytosis was found in fifteen and cells of "glandular fever" type were reported in five. Sore throat was present in ten.

The severity and duration of illness varied enormously. Five of the patients were never really ill, whereas in others the illness dragged on for months. In such cases fatigue was prominent. None had a high fever and eleven were afebrile.

Diagnosis and sources and modes of infection are discussed.

We gratefully acknowledge the help given to us by the many physicians and pathologists who supplied us with material from, and information about, the patients. We also thank Dr. A. H. T. Robb-Smith and Dr. R. Curran for examining sections and Miss Geraldine Calton, A.I.M.L.T., for her skilled technical assistance.

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references continued overleaf

THE REACTION TIME IN MYXŒDEMA

I. P. C. MURRAY
M.B. Glasg., M.R.C.P.E.
HALL TUTORIAL FELLOW, UNIVERSITY DEPARTMENT OF MEDICINE, GARDINER INSTITUTE, WESTERN INFIRMARY, GLASGOW

THE reaction time, which measures the interval between the application of a stimulus to a sensory organ and a voluntary response, is known to be influenced by various factors. Increasing age and fatigue, for example, lengthen it, as do depressant drugs such as alcohol and the barbiturates. It seemed possible that the reaction time would also be prolonged in myxœdema, and that it might be correlated with the degree of thyroid underactivity. A simple and rapid method of measuring the reaction time to a visual stimulus was therefore devised and has been used in healthy people, anæmic patients, and patients with myxœdema. The effects of specific therapy and of dexamphetamine sulphate on the reaction time have also been studied.

Method

The circuit of the apparatus used to measure reaction time is shown in fig. 1. After the subject has depressed key 2, the observer depresses key 1, thus closing the relay contacts AB and CD. As a result the red lamp lights, and the scaling unit is operated by the relay contacts AB and key 2 acting via the electronic gate. The scaling unit records pulses at twice the mains frequency (100 c.p.s.) until key 2 is released by the subject, when the scaler stops (again using the electronic gate) and records the reaction time in seconds up to 9·99 secs.

The subject is instructed to depress the button (key 2) and, immediately he sees the red light, to remove his finger from the button as rapidly as possible. The operator continues to keep his key depressed until after the scaler has stopped and then resets the scaler. Several practice tests were made with each subject to ensure that the instructions were understood. Reaction times were measured at irregular intervals of 5–10 seconds to avoid anticipation. Long intervals were avoided to prevent the subject's attention from wandering. In 5 healthy people and 4 myxœdematous patients a minimum of two hundred consecutive readings were taken. After the first ten to fifteen tests had been made, there was little difference between the mean of each succeeding group of ten. Accordingly, for each person fifty readings were taken, the first twenty being discarded, and the mean of the last thirty recorded as the reaction time. A visual stimulus was used rather than aural because myxœdematous patients often have impaired hearing.

TABLE I—MEAN REACTION TIMES

Age (yr.)	Healthy			Hypothyroid	
	No. of persons	Mean (sec.)	Normal range M ± 2S	No. of persons	Mean
<40	34	0·2286	0·1974–0·2598	7	0·3200
40–50	21	0·2396	0·2084–0·2708	10	0·3053
50–60	26	0·2546	0·2234–0·2858	18	0·3141
>60	20	0·2598	0·2286–0·2910	15	0·4313
Total	101			50	

Control subjects.—This group consisted of 101 healthy people aged 17–83 years and included medical staff, laboratory personnel, and patients in whom there was no evidence of thyroid dysfunction. A further 10 persons with normal thyroid function but with anæmia from various causes (hæmoglobin less than 60%) were also studied. In 5 healthy people the test was repeated at intervals of several weeks.

Hypothyroid patients.—50 patients were studied. The condition was idiopathic in most cases but in some it was secondary to hypopituitarism, Hashimoto's thyroiditis, thyroidectomy, or radio-iodine therapy. Radio-iodine studies and estimations of basal metabolic rate (B.M.R.) and of serum-cholesterol level were made in most subjects. If the diagnosis was uncertain on clinical grounds, a final diagnosis was made only after the results of the administration of *l*-thyroxine sodium were known. 20 of the patients were reviewed at intervals during therapy, and repeated estimations of B.M.R., serum-cholesterol level, and reaction time were made. In 5 patients the reaction times were determined only before and after return to the euthyroid state to eliminate the possible effects of practice. Reaction times were also estimated in a further 9 patients with proved myxœdema who had been euthyroid on thyroxine therapy for periods of six months to two years. In all cases it was ascertained that no barbiturate was being administered.

Dexamphetamine sulphate.—This drug was administered orally in a dosage of 15 mg. to 6 healthy people and 7 myxœdematous patients, and the reaction time was recorded at intervals for the following four to four and a half hours.

Results

The mean reaction times of the healthy people for the four age-groups analysed are shown in table I. The pooled standard deviation is ±0·0156 seconds. If M is the mean of a group and S the pooled standard deviation, then, if the members are normally distributed, the range M ± 2S is one in which 95% of the normal reaction times will lie.

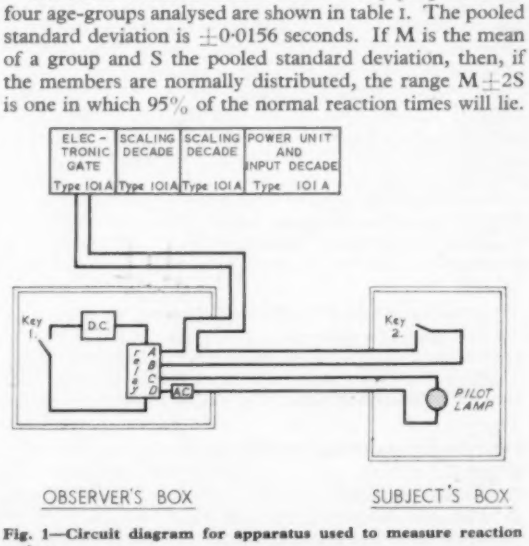

Fig. 1—Circuit diagram for apparatus used to measure reaction time.

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TABLE II—EFFECT OF THYROXINE ON MEAN REACTION TIMES OF MYXŒDEMATOUS PATIENTS

Age	Mean reaction time (sec.)			
	No. of persons	Before therapy	After therapy	Normal mean
<40	4	0·303	0·2287	0·2286
40–50	7	0·322	0·2374	0·2396
50–60	7	0·317	0·2466	0·2546
>60	6	0·423	0·2570	0·2598

These normal ranges are also shown in table I. There was no statistically significant difference between repeated readings in healthy people on different dates. The reaction times of the 10 severely anæmic patients all fell within these normal ranges. The mean values for the reaction times of the 50 hypothyroid patients for each age-group are also shown in table I. There is a significant difference between each and the corresponding normal mean. It can be seen from fig. 2 that the reaction times of 46 of these patients lay outside the normal ranges. The reaction times of the 9 myxœdematous patients who had been euthyroid for a considerable period were all within the normal ranges for their ages. During therapy the reaction times of the myxœdematous patients decreased, and it can be seen (fig. 3) that, when 23 of the 25 patients had become euthyroid, their reaction times lay within the normal ranges. This happened both in the patients observed at intervals and in those in whom the test was repeated only when they were euthyroid. These changes are statistically significant. One patient, while hypothyroid, had a reaction time just within the normal range, but after treatment her " normal " reaction time was faster than normal for her age. In a cretin, aged 14, who had neglected to continue her treatment there was also an improvement on further therapy, but, when she was euthyroid, her reaction time was still much prolonged. This improvement corresponded to a clinical impression of increased alertness, although she still remained mentally retarded. Table II shows the mean reaction times (excluding this case) before and after therapy. For each age-group the values when the patients had become euthyroid, approached the mean for healthy people. The improvement in the reaction times in the hypothyroid patients after treatment paralleled the changes in B.M.R.

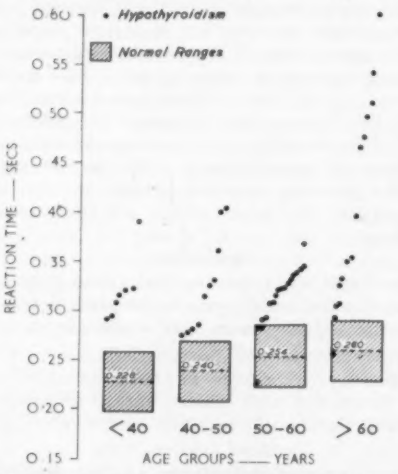

Fig. 2—Reaction times of 50 hypothyroid patients showing the prolongation outside normal ranges (hatched areas).

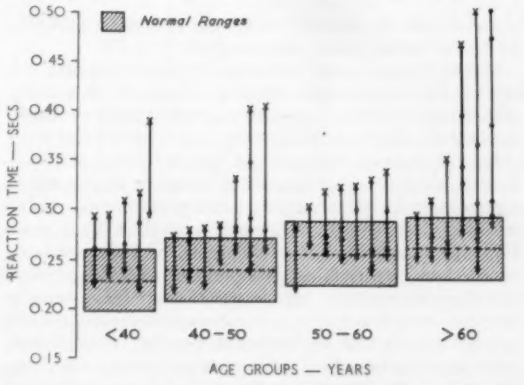

Fig. 3—Effect of therapy on reaction times of 25 hypothyroid patients: x, initial reading; •, readings during period of control; v, final reaction time when patient was euthyroid.

and serum-cholesterol levels. This pattern is illustrated by fig. 4, which shows the response to triiodothyronine in a myxœdematous female aged 44. The reaction time improved rapidly and within four days was within the normal range, where it has remained for a year.

In both the healthy people and the myxœdematous patients dexamphetamine sulphate decreased the reaction time. However, as can be seen in fig. 5, this decrease was greater and more prolonged in the myxœdematous patients than in the healthy people. The mean maximal quickening for the patients was 0·0524 seconds, compared with 0·0248 seconds for healthy people.

Discussion

The method of measuring reaction time used in this study has many advantages over other methods. In particular the apparatus is portable and inexpensive and allows considerable accuracy in timing. The rapidity with which observations may be repeated also permits allowance

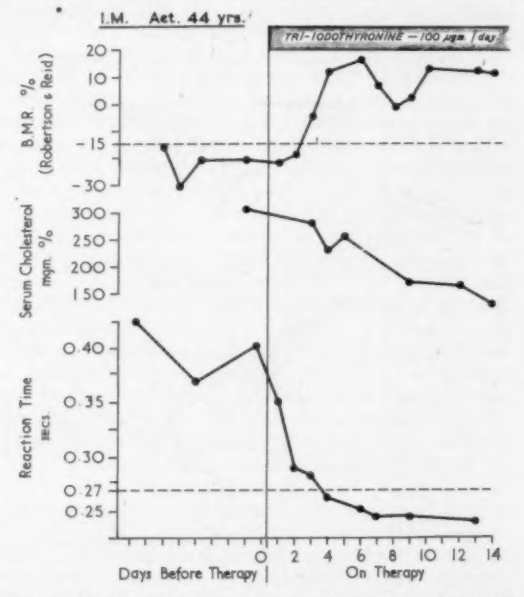

Fig. 4—Effect of triiodothyronine on B.M.R., serum-cholesterol level, and reaction time in a myxœdematous patient.

to be made for the effects of practice, which Forbes (1945) and others have demonstrated.

Mental sluggishness, lethargy, impaired memory, and lack of concentration are common complaints of patients with frank myxœdema, and even mild cases of hypothyroidism may be present with symptoms of this type. Since the reaction time reflects higher mental processes (Evans 1947), it is not surprising to find it lengthened in myxœdema. In a few patients with gross mental apathy resulting from hypothyroidism the test was made more difficult as a result of their inability to understand the instructions. In many of the other cases the diagnosis of hypothyroidism could only be made after full investigation, including the response to a therapeutic trial. In such patients the mental and physical slowing is much less, and it is often this which gives rise to diagnostic difficulty. However, in 46 of these 50 patients the reaction times were prolonged. The possibility that the anæmia which may be associated with myxœdema might play a part in the prolongation of the reaction time was eliminated by the finding of normal reaction times in severely anæmic patients.

The 4 myxœdematous patients who had reaction times within the normal ranges are of special interest. One was an electric welder, a skilled occupation which involved quick and rapid movements of the hands, and he had noted that he was not producing such good work as formerly. The reaction time of another of these patients lay just within the upper limit of the normal range; but, when she became euthyroid, her " normal " reaction time lay below the lower limit of the normal range, suggesting that there had originally been a considerable prolongation. The 2 other patients had only recently become hypothyroid as a result of radio-iodine therapy. It seems possible, from these and other patients studied subsequently, that the hypothyroid state must be present for some time before the reaction time increases.

When the diagnosis of hypothyroidism is obvious on clinical grounds, there is no need for further investigation, confirmation being obtained by the response to specific therapy. For the investigation of cases in which the clinical picture is atypical or incomplete numerous tests have been described, but only a few have been generally adopted. In such difficult cases, however, the results even of these investigations may be of doubtful significance—e.g., radio-iodine studies on patients partially treated. Similarly, electrocardiograms and estimations of serum-cholesterol levels and B.M.R. are often helpful but may at times give equivocal results. I therefore suggest that, in cases of suspected myxœdema, the measurement of reaction time is a simple and rapid aid to diagnosis which causes minimal inconvenience to the patient. Moreover, a useful index of the response of the patient to therapy is provided by the improvement in reaction time. In general this parallels the changes in the clinical picture, the B.M.R., and the cholesterol level (fig. 4). One patient stopped therapy on her own initiative, and her reaction time, which had remained within the normal range for five months when she was euthyroid, again became prolonged.

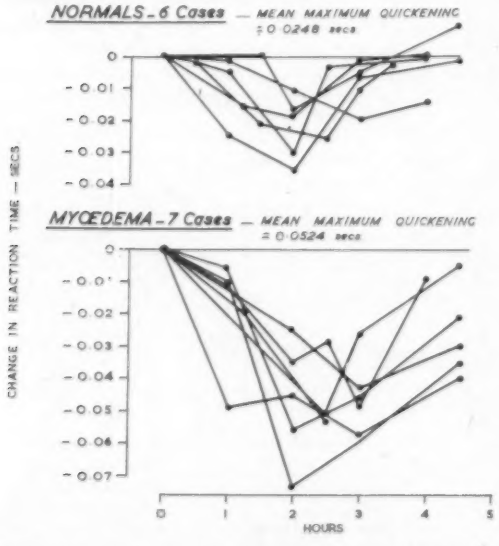

Fig. 5—Changes in reaction time following administration of dexamphetamine to 6 healthy people and 7 hypothyroid patients.

The changes in reaction time in myxœdema probably reflect the changes in cerebral function. The results are comparable with those of Gantt and Fleischmann (1948), who studied the conditioned-reflex function in a cretin and showed that, after successful therapy, there was an improvement which reached a level in two months but did not change further over two years. Other workers have studied the changes in cerebral function in myxœdema, using recognised psychological techniques, and have found evidence of impairment—e.g., Reitan (1953), who used the Rorschach test. Further evidence that the effect is on the higher centres is provided by the results of the studies of the effect of dexamphetamine sulphate (fig. 5). After the administration of this cerebral stimulant there was a definite quickening of reaction time in healthy people. When it was given to myxœdematous patients, the quickening was much greater and lasted considerably longer. The possibility arises that the impairment of reaction time might be influenced by delay in the peripheral component of the arc, but this is unlikely in view of the findings of Murray and Simpson (1958), who showed that the conduction velocity in peripheral nerves was not appreciably altered in hypothyroidism. Similarly, Lambert et al. (1951) concluded that, although the total time taken for the ankle-jerk in myxœdema was increased, there was no appreciable difference in the speed of conduction through the reflex arc in healthy people and in myxœdematous patients. They emphasised that this reflex took place over a two-neurone arc which does not involve the more complex activity of the central nervous system, as does the reaction-time pathway. The estimation of reaction time therefore provides a quantitative index of one aspect of mental activity which is not only more accurate than many conventional tests but also is more easily applied and more readily adaptable to routine clinical use.

Summary

By a simple and rapid method reaction times were estimated in 101 healthy people, 50 patients with hypothyroidism, and 10 patients with severe anæmia.

In 46 of the hypothyroid patients, the reaction time was prolonged. Specific therapy in 25 of these led to quickening of the reaction time, which returned to normal in 24, paralleling the changes in B.M.R. and serum-cholesterol levels.

Dexamphetamine shortens the reaction time of hypothyroid patients to a greater extent than that of healthy

people. The measurement of reaction time provides a quantitative index of impaired cerebral function and is useful in the diagnosis of suspected hypothyroidism and in the assessment of response to therapy.

I wish to thank Prof. E. J. Wayne for his continued encouragement and advice, Dr. J. Crooks for his assistance during this study, Dr. R. A. Robb for the statistical analysis of the results, and Dr. J. M. A. Lenihan for arranging for the construction of the apparatus.

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MOVEMENTS OF THE COMMON BILEDUCT IN MAN

STUDIES WITH THE IMAGE INTENSIFIER

W. BURNETT
M.B. Aberd., F.R.C.S.
HONORARY LECTURER IN SURGERY

R. SHIELDS
M.B. Glasg.
HALL FELLOW IN SURGERY
UNIVERSITY OF GLASGOW

FOR many years the method by which bile enters the duodenum has been of great interest to the physiologist and the clinician. Most studies, however, have been concerned with the mechanism of emptying of the gall-bladder and its functional relationship with the sphincter at the distal end of the common bileduct. Little attention has been paid to any active part which might be played by the common bileduct, which is usually considered to be a transmitting tube with a wall mainly composed of fibrous tissue.

In 1889, soon after Oddi's pioneer work, Copeman reported studies on a patient with a complete external biliary fistula associated with a stone which had completely occluded the common bileduct at its distal end. He noted that the secretion of bile was not continuous, but that there were "short periods of rest, followed by a flow in a series of jerks, which appeared to be caused by waves of peristaltic contraction". This hint of peristalsis in the common bileduct was followed by Mirizzi (1940), who described possible peristaltic movements in the duct and demonstrated contraction of a sphincter at the distal end of the common hepatic duct. These observations were made from a study of operative cholangiograms. This work has not been confirmed.

It occurred to us that it might be possible to study the common bileduct under more physiological conditions in the unanæsthetised patient by using image intensification, which would permit fluoroscopic screening with the additional possibility of recording the findings by cineradiography. We have so far been unable to make any satisfactory observations by using intravenous cholangiography, owing to difficulty in obtaining definition of the biliary tract of sufficient intensity for satisfactory screening. However, studies have been made after surgical exploration by the direct injection of a radio-opaque contrast medium into the common bileduct. We describe here the peristaltic movements which we have seen in the common bileduct in 10 patients after cholecystectomy.

Methods and Results

The biliary tree was examined radiologically with an image intensifier one or two weeks after cholecystectomy or choledochotomy. A water-miscible contrast medium, 50% or 70% sodium acetrizoate, was instilled at the rate of 1 ml. a minute into the common bileduct. The injection was made through a ureteric catheter which had been inserted at operation for a distance of about 1 cm. into the common bileduct through the stump of the cystic duct. If the common bileduct had been explored, the injection was made through a short T-tube left in the common bileduct at operation. An initial injection of 3 ml. was made. Screening was done at this time to observe the filling of the duct. As the duct emptied into the duodenum, further increments of the same or less volume were instilled, the amount being determined by the rate of emptying. No disturbance was experienced by the patient, and no distension of the common bileduct was allowed to take place at any time. Observations were made both during the injection and afterwards. After 5–10 minutes for stabilisation of conditions in the duct permanent records were made on 35-mm. film by cineradiography with a built-in 'Arriflex' camera so arranged that screening and cineradiography could be done simultaneously. It was found suitable to take the film at a rate of 16 frames a second.

Ten patients were studied, similar findings being made in each case.

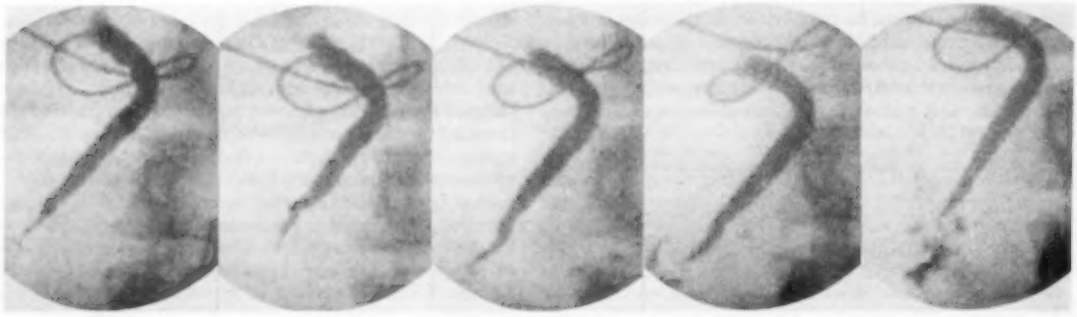
Movements of Common Bileduct and Duodenum

Four different types of movement were observed in the bileduct and the related portion of the duodenum. Details of these movements were more obvious in thinner patients because visualisation was easier.

Peristalsis of Common Bileduct

We observed waves of peristalsis in the common bileduct in all ten patients studied, whether or not the common bileduct was intact or had been previously explored. The peristaltic waves travelled towards the duodenum at the rate of 3–5 or more a minute and lasted 1–3 seconds. On one occasion 5 waves were seen in 36 seconds. Sometimes a minute or more elapsed without a contraction. Not all of the waves were complete and brought the medium into the duodenum; some were abortive, ending near the sphincter; but, when a wave travelled the whole length of the duct, the medium was ejected forcibly into the duodenum, and a successful complete wave was usually followed by several more. At the end of a phase of peristalsis a well-marked retraction was seen at the lower end of the duct, which changed from a slender tapering channel to a shorter wider one with what appeared to be a blunt and almost rectangular tip. This appearance is similar to that produced by an injection of morphine. These peristaltic movements are seen in ducts which are not under increased pressure and are not being injected with contrast medium at the time of observation.

The supraduodenal angle of the duct is a suitable point for orientation when screening. This point is situated just distal to the junction of the cystic and common bileducts. Distal to the angle the common bileduct changes direction to run downwards and slightly laterally to its termination. When contrast medium first enters the common duct through the cystic-duct stump it runs distally towards the duodenum. Some minutes later it fills the common hepatic and the right and left hepatic ducts. This initial distal movement may be of no significance and result from flow along a distally directed catheter. On the other hand, it may support the suggestion made by Mirizzi (1940) that a sphincter is present at the



(a) (b) (c) (d) (e)

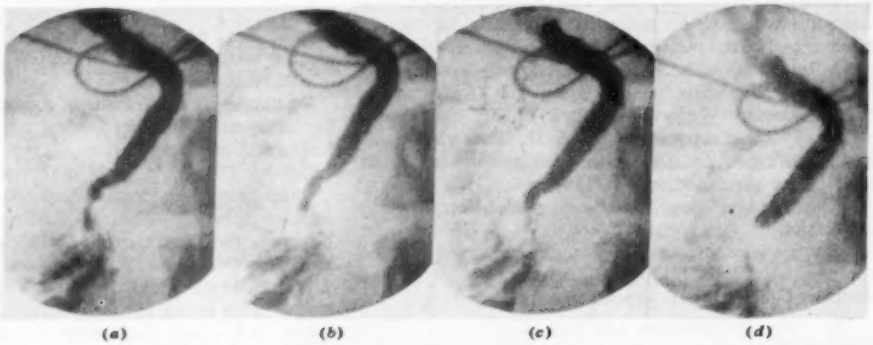
Fig. 1—Stages in peristaltic waves in distal common bileduct, from cineradiographic film of biliary tract of woman, aged 38, who underwent cholecystectomy 10 days earlier. Times between photographs: *a–b*, 4·9 sec.; *b–c*, 2·3 sec.; *c–d*, 2·9 sec.; *d–e*, 8·0 sec.

distal end of the common hepatic duct. Mirizzi's argument is supported by cholangiograms made during operation, which show extreme narrowing of the main bileduct at the junction with the cystic duct. These may possibly represent movements of maximal contraction during a peristaltic wave, but in this region of the duct the peristaltic waves which we have seen do not cause complete obliteration of the duct. They can be described as ripples progressing distally, which can be clearly identified but do not completely occlude the duct. Distal to the supraduodenal angle the contractions are greater, making greater indentations in the duct wall as the peristaltic wave passes along.

These peristaltic waves can be seen easily on screening and have been reproduced by cineradiography. It has not proved possible to illustrate them completely by serial reproductions from a film strip, but some aspects can be seen in figs. 1 and 2 taken from a cineradiographic film of the bileduct of a female patient, aged 38, who underwent cholecystectomy for gallstones 10 days earlier. At operation the common bileduct appeared normal, and this was confirmed by operative cholangiography. The duct was not explored. In figs. 1 and 2 a ureteric catheter can be seen entering the common bileduct through the stump of the cystic duct. Through this catheter 70% sodium acetrizoate was injected into the common duct.

Fig. 1 shows various stages in peristaltic waves which have reached the distal common bileduct. The medium can be seen entering the empty duodenum. Comparison of fig. 1a and fig. 1d, with reference to the relation of the supraduodenal angle of the duct to the vertebræ, shows the extent of normal respiratory movement.

Fig. 2 shows the considerable change in the appearance of the same duct 20 minutes later. Various stages in waves in the distal portion of the duct are reproduced for comparison with fig. 1. In addition fig. 2d shows the appearance of the duct in its resting or non-peristaltic state at the completion of a wave 5·7 seconds after the exposure of fig. 2a. The appearance of the duct in fig. 2d is very like that seen after a subcutaneous injection of morphine.



(a) (b) (c) (d)

Fig. 2—Same duct as in fig. 1, 20 minutes later, showing stages in peristaltic waves (*a–c*) and resting phase (*d*). Times between photographs: *a–b*, 2·1 sec.; *b–c*, 1 sec.; *c–d*, 2·7 sec.

Respiratory Movement

The whole biliary tree moves with each respiratory excursion; a downward movement in inspiration is followed by a return upward movement in expiration. The bileduct and the duodenum move together, but the ejection of contrast medium into the duodenum is not in any way associated with these movements. In common with many other workers we have observed, by simple manometry, that pressure changes occur in the common bileduct during each respiratory cycle—normally about 1 or 2 cm. of bile. These minor but definite rises in pressure can be considerably increased by deep inspiration or by coughing; but they do not appear to contribute to the emptying of the common bileduct, because the emptying of the duct into the duodenum is not regularly related to the observed respiratory movement or significantly increased by deep inspiration or by coughing.

Transmitted Arterial Pulsation

In a patient with a thin abdominal wall it is possible to see, on screening, that the common bileduct pulsates synchronously with the aorta. This is not surprising, because the aorta and the cœliac axis are close to the duct, and the hepatic artery runs in intimate relationship with the duct; hence transmitted pulsation may be expected. This movement is of minor degree and has no bearing on the emptying of the duct.

Associated Duodenal Movements

A study of duodenal movements in relation to the

observed peristaltic and respiratory movements of the common bileduct was possible after some of the contrast medium had entered the duodenum from the duct. As has been described above, the duodenum and the common bileduct move together during respiration. In addition, forward and reverse peristalsis is clearly seen in the duodenum itself. We have not found that this peristalsis plays an active part in emptying the duct. No duodenal movement is usually seen while the duct is expelling its contents in jets through the duodenal papilla; nor does any active duodenal contraction precede this. But duodenal peristalsis usually begins after one or more waves of bileduct contraction. This peristalsis is initially in the reverse direction; so the contrast medium is swept upwards towards the first part of the duodenum and the pylorus. This movement is followed by forward peristalsis. This succession of duodenal contractions would be expected to lead to efficient mixing of food, bile, and pancreatic juice in the second part of the duodenum.

Previous observations on the functional relationship of the intraduodenal portion of the common bileduct to movements of the duodenum were made by Lueth (1931) and Long (1942). Both made their experimental studies on dogs, and both thought that the sphincteric region and the duodenal wall usually acted together. Lueth thought that the intraduodenal portion was capable of independent action. Our own finding that the duct empties into the duodenum while the duodenum is relaxed confirms a similar finding by Lueth. It also supports the concept of an integrated functional relationship between the common bileduct and the duodenum, in that a true peristalsis (by the definition of Bayliss and Starling) in the common bileduct is preceded by a relaxation in the duodenum before the peristaltic wave reaches it.

Histological Structure of Common Bileduct

It is commonly believed that the common bileduct in man is a fibrous structure containing no muscle except at its termination. Standard textbooks of anatomy do not agree on its histological structure. Brash and Jamieson (1937) briefly describe it as agreeing with the gallbladder in structure. Johnston and Whillis (1954) say that the fibrous coat of the duct is "composed of strong fibro-areolar tissue, with a certain amount of muscular tissue, arranged, for the most part, in a circular manner". On the other hand, Grant (1940) feels that "the extrahepatic ducts are fibrous tubes containing many elastic fibres but without a muscle coat". This opinion is also held by Kozoll et al. (1957), who describe the wall of the duct as consisting of "a meshwork of interlacing collagen and elastic fibres . . . smooth muscle is only seen in the intra-duodenal segment".

Burden (1925) reported on the structure of the supraduodenal portion of the common bileduct, basing his description on a study of 100 necropsy specimens. He found that the bileducts were supplied with a well-developed musculature. The muscle was situated in the outermost layers of the wall, both in longitudinal and circular bundles, the former being the more notable. Burden could not find a published description of peristalsis in the human bileduct but thought it possible from its structure.

Our observations on the supraduodenal bileduct in man show that there is indeed an interlacing network of collagen and elastic fibres in the wall as described by Grant (1940) and Kozoll et al. (1957), but there is smooth-muscle tissue in the duct (fig. 3) varying in amount with the individual, the muscle-fibres interdigitating with collagenous and elastic tissue.

Discussion

We have shown that peristaltic movements occur in the common bileduct in man, and we are convinced that the anatomical basis for this is present.

Following these observations, we have begun a comparative study of histological structure and biliary-tract movements in animals. We have confirmed that obvious peristalsis can be seen under anæsthesia where there is muscular tissue in the duct wall. The occurrence of peristalsis is not related to the presence or absence of a gallbladder in the species concerned (unpublished observations).

Peristalsis has not been described in the common bileduct at operation, but this need not imply that it does not occur under physiological conditions. At operation the effect of the drugs used for premedication and for anæsthesia may be sufficient to reduce or to abolish movements; the length of bileduct actually exposed and available for study is usually short; and it is rare for a healthy duct to be closely examined. We have studied movements of the duct only after cholecystectomy; perhaps they occur as a compensatory mechanism after cholecystectomy. However, the gallbladders removed before the radiological studies in this series had obviously been functionless for many months.

As a result of this study we believe that the common bileduct functions as an actively contracting duct rather than as a passive transmitter of bile. This concept may modify current views on the genesis of biliary pain and permit the consideration of common bileduct colic as

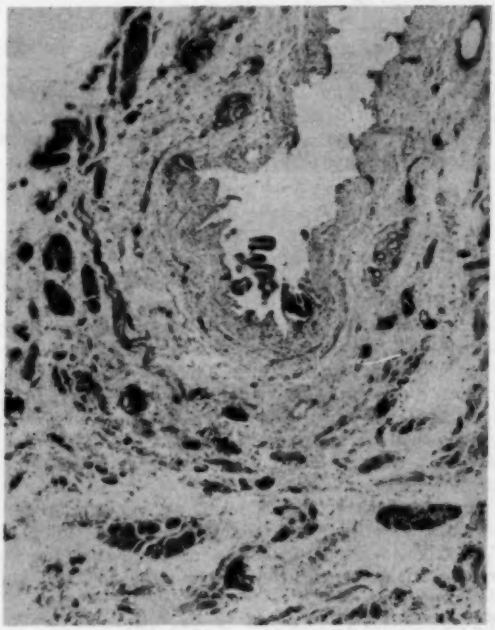


Fig. 3—Cross-section of distal quarter of human common bileduct proximal to intraduodenal portion. Smooth muscle is present, chiefly in outer coat. Muscle bundles are mainly longitudinal but there are some oblique and circular fibres. Mucosa has been almost completely destroyed by autolysis. (Hæmatoxylin and eosin. ×40.)

an entity similar in nature to ureteric and intestinal colic.

Summary and Conclusions

By image intensification and cineradiography we demonstrated peristaltic movements in the common bileduct in man after cholecystectomy.

The waves of peristalsis were directed distally along the duct towards the duodenum and propelled bile into the duodenum.

Respiratory and duodenal movements were also studied; they played no great part in emptying the bileduct under the conditions of our observations.

We believe that there is sufficient muscle in the wall of the bileduct to produce these observed rhythmic movements, and conclude that this intrinsic muscle is responsible.

We thank Professor Illingworth and Dr. Scott Park for providing facilities to make this study, and the radiographers of the Western Infirmary, Glasgow, for their cooperation.

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EXCRETION OF FLUID IN MALABSORPTION STATES

R. MISK
M.D. Beirut
RESEARCH FELLOW OF THE BRITISH COUNCIL

B. A. SCOBIE
M.B. N.Z.
HOUSE-PHYSICIAN

W. H. J. SUMMERSKILL
M.A., D.M. Oxon, M.R.C.P.
SENIOR REGISTRAR

From the Department of Gastroenterology, Central Middlesex Hospital, London

DISORDERED metabolism of water in idiopathic steatorrhœa is suggested by the tendency to œdema of the ankles and nocturnal polyuria. Wollaeger and Scribner (1951) showed that, after an oral water load in such patients, diuresis was impaired in the non-fasting state but not when the patients were fasting. They therefore concluded that the presence of food, with pooling of fluid in the intestines, delayed the absorption of water and consequently retarded its excretion. Taylor (1955a), however, could not improve the defective diuresis by fasting in idiopathic steatorrhœa.

We report here diuretic responses to water loads in various malabsorption states, including idiopathic steatorrhœa. In particular we compare the effects of intravenous and oral loads given to fasting and non-fasting persons.

Materials and Methods

We studied 14 patients with malabsorption syndromes (see table): 3 had idiopathic steatorrhœa, 4 regional ileitis (including 2 with resections of small intestine), 1 tuberculous enteritis followed by resection of terminal ileum, 1 jejunal diverticulosis, and 5 steatorrhœa following total or partial gastrectomy. The fæcal fat averaged more than 5 g. per twenty-four hours over three days on varied ward diets, thus conforming with Cooke's (1956) criteria for steatorrhœa. Additional diagnostic investigations, by standard methods, included examination of peripheral blood and sternal marrow, estimations of serum-protein and serum-electrolyte levels, radiological studies of the alimentary tract and bones, surgical or aspiration biopsies of the small intestine, and oral glucose-tolerance tests.

The patients were divided into three clinical grades of severity judged particularly by loss of weight and by disability: grade I, mild or in remission; grade II, moderately active disease; grade III, severe relapse requiring admission to hospital (see table).

In no patient did the history, clinical findings, specific gravity and routine analysis of the urine, or blood-urea level suggest renal disease.

We studied as controls 19 persons, of comparable age and sex, recruited from hospital staff and patients. None had evidence of renal, hepatic, cardiac, endocrine, or gastrointestinal disease with the exception of peptic ulcer.

The subjects received oral tap-water loads (20 ml. per kg. of body-weight) under fasting and non-fasting conditions and intravenous water loads as 5% dextrose (15 ml. per kg. of body-weight) in the fasting state. For fasting tests nothing was allowed by mouth after 10 P.M. the previous night. After the bladder had been emptied next morning, the fluid was given within forty-five minutes, and the output of urine over the next four hours was measured. Non-fasting tests were made after the midday meal but otherwise with the same routine. The patients were recumbent during the tests, and the volume of urine was recorded as a percentage of the intake of fluid under each of the test conditions. The mean percentage of the fluid loads excreted was calculated from the volume of urine excreted in four hours after the three tests.

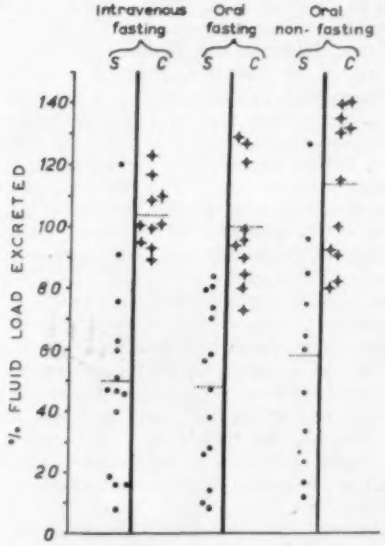

Fig. 1—Excretion of fluid by patients with steatorrhœa and by controls.

S = steatorrhœa. C = control. Interrupted transverse line = mean excretions.

FOURTEEN CASES OF MALABSORPTION SYNDROME

Clinical grade	Case no.	Age (yr.)	Sex	Diagnosis	Fat excreted in fæces in 24 hr. (g.)	Loss of weight (lb.)	Hg. (g. per 100 ml.)	Serum-albumin (g. per 100 ml.)	Serum-potassium (mEq. per litre)	Serum-sodium (mEq. per litre)	% of fluid excreted in 4 hr.		
											Intravenous fasting	Oral fasting	Oral non-fasting
I	1	32	M	Crohn's disease; ileal resections (1955 and 1957)	15	6	14·8	4·0	3·9	132	47	73	84
	2	33	M	Idiopathic steatorrhœa in remission on gluten-free diet	13	Nil	13·6	4·0	3·9	140	60	38	126
	3	54	F	Partial gastrectomy (1957)	14	7	14·0	4·4	—	—	91	83	64
	4	71	M	Jejunal diverticulosis	19	Nil	14·0	3·8	3·9	127	120	81	24
	5	19	M	Crohn's disease of ileum	12	9	12·0	4·4	4·0	136	47	58	96
II	6	51	M	Idiopathic steatorrhœa, compensated hepatic cirrhosis	65	14	12·2	2·2	3·4	130	63	56	75
	7	55	M	Tuberculous ileocolitis, rt. hemicolectomy (1951), resection of blind loop (1956)	35	28	12·5	4·0	3·8	147	76	48	—
	8	60	M	Partial gastrectomy (1949), osteomalacia and osteoporosis	10	28	12·6	4·2	4·5	135	51	80	46
	9	61	M	Total gastrectomy for peptic ulcer and œsophageal stricture (1957)	15	28	12·2	2·8	3·5	135	46	70	60
III	10	41	M	Crohn's disease, rt. hemicolectomy (1950), partial gastrectomy (1955)	50	35	10·1	3·3	4·5	135	8	8	13
	11	38	F	Crohn's disease of ileum	24	21	8·8	2·7	3·6	147	16	13	—
				(3 weeks after treatment)	6	Gained 14	10·2				112	91	67
	12	72	M	Idiopathic steatorrhœa	15	42	13·0	3·2	2·5	130	18	28	17
	13	51	M	Total gastrectomy (1956), carcinoma of jejunum	33	51	10·1	4·5	2·4	147	16	10	—
	14	62	M	Partial gastrectomy (1951)	8	21	8·9	3·3	4·5	127	40	27	34

Results

All the patients with steatorrhœa had impaired diuresis compared with the controls both when the water loads were given orally (fasting or non-fasting) or when they were given intravenously in the fasting state. Cases 1–5 and 8 achieved diuretic responses within the normal range but not under all three test conditions. In patients with steatorrhœa there was a wider range of response under all the test conditions than in the controls. The mean excretion of fluid after each method of giving the water load was between 48–58% in the patients with steatorrhœa and 100–114% in the controls (fig. 1). Fasting did not influence the diuretic responses to oral water loads in the patients with steatorrhœa.

The diuresis was subnormal not only in the patients with idiopathic steatorrhœa but also in those with malabsorption due to total or partial gastrectomy, Crohn's disease, tuberculous enteritis, or jejunal diverticulosis (see table). There was a correlation between the impairment of diuresis and the severity of the disease, the mean excretions in the three test conditions being grossly impaired in grade-III patients and relatively intact in grade-I patients (fig. 2). In case 11 diuresis improved three weeks after treatment, in keeping with the clinical improvement (see table).

The hæmoglobin level was 12 g. per 100 ml. or below in 5 patients, the anæmia being macrocytic in 3, normocytic in 1, and due to iron-deficiency in 1. The anæmia was severest in grade-III patients, thus being associated with defective diuresis. There was no relationship between the degree of steatorrhœa and the diuresis (fig. 3).

Clinical and radiological evidence of intestinal distension was present in cases 4, 6, 7, 13, and 14. "Steatorrhœa" patterns were found in cases 2–4, 6, 8, and 10–14. There was therefore no relationship between impaired diuresis (see table) and the degree of distension of the small intestine or other radiological appearances.

Serum-potassium levels were low in some patients,

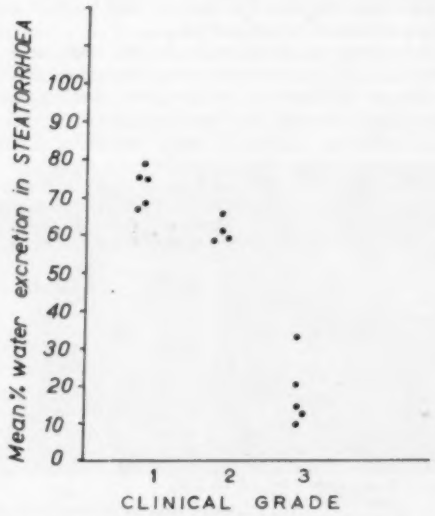

Fig. 2—Excretion of fluid in relation to clinical condition.

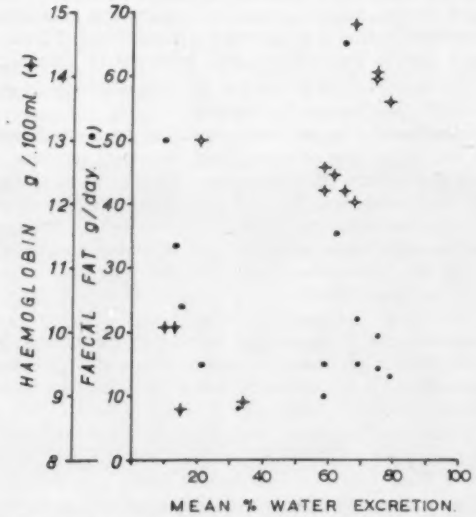

Fig. 3—Excretion of fluid in relation to severity of anæmia and of steatorrhœa.

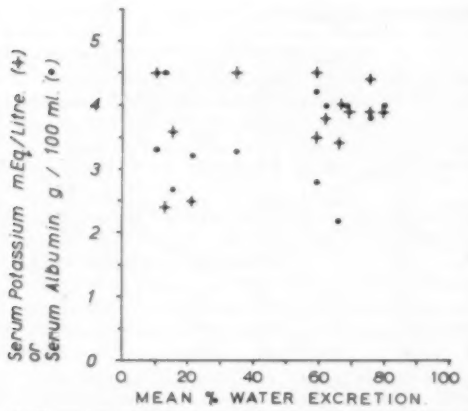

Fig. 4—Excretion of fluid in relation to serum-potassium and serum-albumin levels.

more particularly those who were more severely ill, but no relationship with diuresis was apparent. Similarly, impairment of diuresis was not related to the degree of hypoalbuminuria (fig. 4).

Specimens of upper jejunum were obtained from 10 patients with steatorrhœa (in case 6 at laparotomy, in case 13 at necropsy, and from 8 patients by aspiration biopsy). Diuresis was not directly related to either the presence or the absence of mucosal changes, because biopsy specimens from cases 3, 4, 6, 8, and 14 were normal, and those from cases 2, 7, 11, and 12 showed mucosal atrophy.

Nocturnal polyuria, with or without œdema of the ankles, was pronounced in cases 7 and 9 (grade II) and 10, 12, and 13 (grade III)—i.e., in association with more severe impairment of diuresis.

Discussion

Impaired absorption of water, due to the pooling of fluid in the gut during the digestion of food, was emphasised by Wollaeger and Scribner (1951) as the cause of the delayed diuresis in idiopathic steatorrhœa, but we, like Taylor (1955a), found comparable impairments in diuresis under both fasting and non-fasting conditions. Furthermore, clinical and radiological evidence of intestinal distension with fluid levels and gas was unrelated to the efficiency of diuresis in our patients.

Nevertheless, studies with isotopes have confirmed that the absorption of water from the small intestine is delayed in idiopathic steatorrhœa (Higgins et al. 1957). This could theoretically be due to lesions of the small-intestinal muscosa (Paulley 1954, Shiner 1957). Mucosal changes in the small intestine are also present in Crohn's disease and tuberculous enteritis, and they may follow partial gastrectomy (Baird and Dodge 1957). Impaired diuresis, in the present study, was a feature of all these conditions, but it could not be related directly to the severity of the histological lesions found in the small gut, and subnormal responses to water loads were obtained in the absence of demonstrable mucosal changes.

A similar impairment of diuresis after the intravenous administration of fluid suggests that altered renal excretion of water was a more important factor than intestinal malabsorption. Simple dehydration is unlikely to explain the impaired diuresis, because the same delays in excretion were found in both fasting and non-fasting states, and in most patients there was no watery diarrhœa or other cause of dehydration.

Patients with more active disease exhibited the greatest impairment of diuresis, and, in the 1 patient studied, rapid improvement followed successful treatment. A subnormal diuretic response to water loading is to be anticipated in many types of serious illness but not to the degree that was found in malabsorption states. Anæmia (Taylor 1954b, 1955b) and malnutrition with or without hypoproteinæmia (Sinclair 1948) may influence the renal excretion of water to some extent. In the present series severely ill patients had lost the most weight and had the greatest anæmia, but abnormal results also occurred in the absence of anæmia or of malnutrition. There was no correlation between diuresis and serum-albumin levels or the amount of fat in the stools. This accords with the findings of Cooke (1957), but Taylor (1954a) found a relationship between diuresis and the degree of steatorrhœa.

In addition to disordered metabolism of water, faulty absorption of sodium (Newsholme and French 1954) and fæcal loss of sodium and potassium (Cooke et al. 1953) have been reported in idiopathic steatorrhœa. Cooke (1957) postulated that a renal tubular nephropathy due to depletion of potassium might contribute to the impaired diuresis in idiopathic steatorrhœa. No evidence of kidney disease was found in the present study; but we could not fully exclude a nephropathy, and hypokalæmia was sometimes present. Cooke failed to influence the diuresis by administering hydrocortisone, in contrast to the improvement coinciding with the use of hydrocortisone in a patient reported by Nabarro et al. (1957). These considerations therefore indicate a profound metabolic disorder of both water and electrolytes during relapses in the malabsorption syndrome, possibly implicating adrenocortical or neurohypophyseal function and resembling the abnormal diuretic patterns in cardiac, renal, and hepatic disease.

Summary

Diuresis is delayed after the administration of fluid in idiopathic steatorrhœa and in other small-intestine malabsorption states. A comparable impairment of diuresis follows both oral and intravenous fluid loads in both the fasting and the non-fasting states.

The degree of impairment of the response is more closely related to the severity of the clinical condition than to specific biochemical, radiological, hæmatological, or histological changes, and, as a casual factor, disordered renal excretion appeared more important than malabsorption of water from the intestine.

We are grateful to Dr. F. Avery Jones for advice and for encouragement of these studies; Dr. M. Shiner for the aspiration biopsies of the jejunum; and Sister M. Johnson and Sister M. Spire and their nurses for preparing the patients and collecting the specimens.

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HÆMORRHAGIC PLEURAL EFFUSION AS A MANIFESTATION OF SCURVY

WILLIAM ROZNER
M.D. Strasbourg, D.T.M. & H.
CHEST PHYSICIAN, NEWCASTLE REGIONAL HOSPITAL BOARD

JUNE LLOYD
M.B. Bristol, M.R.C.P.
JUNIOR HOSPITAL MEDICAL OFFICER, SOUTH SHIELDS HOSPITALS

SCURVY in Great Britain is not as rare as previously believed (Thompson 1954, Cutforth 1958). The clinical manifestations now encountered differ greatly from the textbook descriptions.

Case-report

A joiner's labourer, aged 62, was seen by one of us (W. R.) on April 24, 1957, at his home with six weeks' history of right pleural pain and increasing dyspnœa. He was admitted the same day to Primrose Hill Hospital, Jarrow on Tyne.

In October, 1954, he had had epigastric pain between meals, relieved by alkalis and vomiting. A barium meal examination that year showed a large gastric ulcer on the lesser curve extending into the posterior wall. The chest radiograph was then normal.

First previous admission.—In January, 1955, he had been admitted to another hospital for treatment of his peptic ulcer. His hæmoglobin (Hb) was 101%, leucocyte-count 8800 per c. mm. (normal differential count), urine normal, Wassermann reaction and Kahn test negative, fæcal occult blood present in one of six specimens. He was treated with diet, alkalis, and iron, and discharged improved at the end of five weeks to continue with the same treatment and to attend for review as an outpatient. On March 3, 1955, barium meal did not show the previously noted ulcer crater. The chest radiograph was again normal.

Second previous admission.—On June 7, 1956, he was admitted as an emergency with a month's history of increasing effort dyspnœa and left pleural pain. He looked ill and was cyanosed and dyspnœic, with signs of a left pleural effusion. A chest radiograph (fig. 1) on the same day showed a left pleural effusion, and aspiration yielded 20 ml. of grossly bloodstained fluid which was sterile on culture. The blood-urea was 36 mg. per 100 ml., liver-function tests were normal, plasma-proteins 6·15 g. per 100 ml., sputum negative for tubercle bacilli, no occult blood in fæces, Hb 47%, no evidence of iron deficiency on blood-film, and erythrocyte-sedimentation rate (E.S.R.) 115 mm. in the first hour (Westergren). He was treated with vitamins ('Abidec') and intravenous iron ('Ferrivenin'), and the chest was aspirated on several occasions, grossly bloodstained fluid being obtained each time. He was discharged on Aug. 1, 1956, clinically improved but still with a left pleural effusion. In view of the history of gastric ulcer, malignancy with pulmonary metastases was suspected, and he was asked to attend for outpatient review. When he was seen on Sept. 18, his condition was found to be satisfactory and he defaulted from further attendance.

Course.—Four months before admission in April, 1957, he ceased work on account of general malaise followed by pain in the right loin and a series of upper respiratory infections. He remained in bed for three weeks. Six weeks before admission he complained of severe right pleural pain which persisted, increasing dyspnœa, and generalised weakness. His diet since the onset of his ulcer symptoms (October, 1954) had consisted mainly of carbohydrates and boiled fish, with the exclusion of meat and vegetables, and he had received no additional vitamins since his discharge from hospital in August, 1956. There was no family history of blood dyscrasias.

On admission (April 24, 1957) he was ill and dyspnœic with signs of a right pleural effusion. There were splinter hæmorrhages under the nails of both hands, a few small bruises on the left leg, and considerable bruising and swelling of the right lower leg. He had no teeth and his gums appeared healthy.

Investigations.—The pleural fluid was grossly bloodstained and sterile on culture; subsequent examinations showed Hb 24–34% in the fluid. In the blood, the Hb was 60% (8·9 g. per 100 ml.), erythrocyte-count 3,410,000 per c.mm. (colour-index 0·9), and leucocyte-count 4600 per c.mm.; the red cells showed mild anisocytosis and hypochromasia. The bleeding-time was 2 min., Hess' test negative, and prothrombin-time normal. The Wassermann reaction and Kahn test were negative, the E.S.R. (Wintrobe) was 52 mm. (uncorrected) or 28 mm. (corrected for anæmia) in the first hour. Fæces (three specimens) contained no occult blood. A chest radiograph on admission showed a large right pleural effusion; the left side was clear (fig. 2). An ascorbic-acid saturation test showed no excretion until the seventh day.

Treatment and further observations.—He was treated by repeated chest aspirations, oral iron, and large doses of ascorbic acid. His general condition improved quite rapidly, the skin hæmorrhages faded, and his effusion lessened (fig. 3). In view of the previous suspicion of malignancy he was transferred for special investigation to Holywood Hall Hospital on Jan. 13, 1957. Bronchoscopy (Mr. W. C. Barnsley) was normal. A bronchogram showed some crowding and bronchiectasis of the posterior basic segment of the right lower lobe. Pleural fluid was reported as containing "several clumps of cells almost certainly neoplastic". An electrocardiogram was normal. Hb 83%; platelets not diminished; clotting-time 10 min. 15 sec.; bleeding-time 4 min. 20 sec. He was discharged home on July 13.

Follow-up.—Since his discharge he has been followed up by one of us (W. R.) and a chest radiograph on Aug. 7 showed that the effusion had completely cleared. He continues to have indigestion, and is keeping to his diet but having vitamin supplements. When he was last seen on March 3, 1958, his chest radiograph (fig. 4) showed a shallow right costophrenic

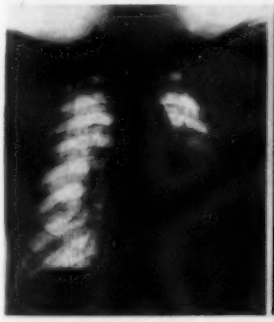

Fig. 1

Fig. 2

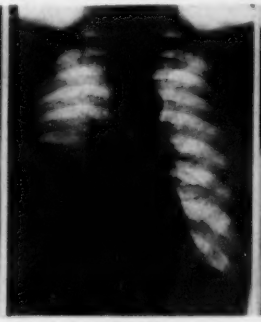

Fig. 3

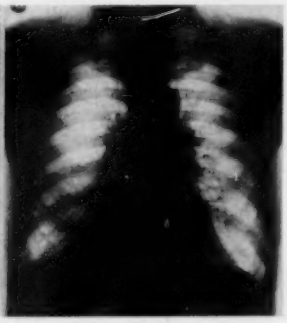

Fig. 4

Fig. 1—June 6, 1956: left pleural effusion.
Fig. 2—April 24, 1957: right pleural effusion.
Fig. 3—May 31, 1957: right pleural effusion, less than in fig. 2.
Fig. 4—March 3, 1958: lung fields clear except for slight pleural thickening in right costophrenic angle and crowding of bronchi in right lower zone.

angle and some distortion and crowding of the bronchi in the right lower zone. He was feeling well enough to ask to return to work.

Discussion

We are in no doubt that both hæmorrhagic pleural effusions in our patient were manifestations of scurvy. His ascorbic-acid intake was known to have been deficient for at least eighteen months before the onset of symptoms. When we saw him he had other manifestations (skin lesions), and on both occasions the effusions cleared after additional ascorbic acid was given. He did not present with bleeding gums, but Leitner and Church (1956) have drawn attention to the fact that bleeding gums in scurvy are exceptional in elderly edentulous patients.

The ascorbic-acid saturation test is not considered to be very reliable (*British Medical Journal* 1945, Bartley et al. 1953), but Harrison (1957) emphasises that the vitamin should appear in the urine in a healthy person on the first or second day after an intake of 700 mg. daily. When the diet has been deficient, three, four, or more days elapse before there is a good excretion. In our patient the excretion was 53 mg. of ascorbic acid in twenty-four hours on the seventh day after a daily intake of 700 mg.

As for the site of the bleeding, we know of no reason why it should not be in the pleural cavity in the same way as in the peritoneum (Cutforth 1958). To our knowledge no modern textbook mentions scurvy as a cause of hæmorrhagic pleural effusion. The older writers, however, were aware that the chest was affected in this disease. Lind (1753) writes:

> "I believe indeed it will universally be found that in the progress of this distress the breast is always more or less affected unless the belly is very open. The pain shifts in it from one part to another, often to opposite sides, and is at first perceived upon coughing only; but when the malady is further advanced it commonly fixes in a particular part, most frequently in the side, where it becomes extremely severe and pungent so as to affect the breathing; a dangerous symptom in this distress."

Smith (1909) also mentions bloodstained effusions in the pleural and pericardial sacs.

Our patient presented on two separate occasions with hæmorrhagic pleural effusion (on opposite sides), both eventually clearing completely. We feel that scurvy is worth considering in the differential diagnosis of hæmorrhagic pleural effusions, and we should like to emphasise the need for additional ascorbic acid in patients on long-continued ulcer diets.

Summary

A case is described of adult scurvy presenting on two occasions with hæmorrhagic pleural effusions on opposite sides.

The only other manifestation of scurvy was skin lesions.

Other causes of hæmorrhagic pleural effusion were excluded, and both effusions cleared completely after treatment with ascorbic acid.

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CLINICAL, RADIOGRAPHIC, AND PATHOLOGICAL STUDIES OF THE LUNGS OF ELECTRIC-ARC AND OXYACETYLENE WELDERS

H. E. HARDING
D.M. Oxon.
DIRECTOR OF PATHOLOGY, SALISBURY AREA

A. I. G. MCLAUGHLIN
M.D. Sydney, F.R.C.P.
FORMERLY H.M. DEPUTY SENIOR MEDICAL INSPECTOR OF FACTORIES

A. T. DOIG
M.D. St. And., F.R.F.P.S., M.R.C.P.E., F.R.S.E., D.P.H.
H.M. DEPUTY SENIOR MEDICAL INSPECTOR OF FACTORIES; LECTURER ON INDUSTRIAL HYGIENE IN THE UNIVERSITY OF ABERDEEN

ELECTRIC-ARC and oxyacetylene welders (and cutters or burners) are exposed to the inhalation of freshly formed iron oxide during their work. Doig and McLaughlin (1936) drew attention, after clinical, radiographic, and environmental studies, to the abnormal appearances found in the X-ray films of such workers, which they suggested, among other possibilities, might be due to the presence of aggregates of iron-oxide dust in the lungs. They further suggested that iron oxide might be opaque to X-rays and cause the abnormal shadows without the presence of fibrosis.

Enzer and Sander (1938) published the first description of the necropsy findings in an electric-arc welder who had shown the characteristic X-ray changes during life. They found aggregates of iron pigment in the lung without accompanying fibrosis. For many years this was the only published pathological report of the lungs of a welder—a fact which suggests that the occupation does not carry a high mortality.

Experimental work (Harding 1945, Harding et al. 1947) has shown that iron oxide does not cause fibrosis in the lungs of animals. Studies of the pathology of the lungs of workers who inhale iron oxide in other occupations—e.g., silver finishers (McLaughlin et al. 1945, Barrie and Harding 1947)—have shown that iron does not cause fibrosis of the lungs. One of us (Harding 1948) did find 1 silver finisher who had slight mixed-dust fibrosis in his lungs. This man, however, had worked for five years as a labourer in a steel works and had been exposed for this length of time to the inhalation of free silica in addition to iron.

Doig and McLaughlin (1948) described the cases of 2 welders, in whom the abnormal X-ray appearances disappeared in one case, and diminished in the other; in the former there had been no further exposure to iron oxide, and in the latter there had been less than before.

Other investigators of groups of welders (Britton and Walsh 1940, Groh 1944, Sander 1944, Waniek 1944, Enzer et al. 1945, d'Onofrio and Passeri 1950, Doig and Duguid 1951, Poinso et al. 1953) are agreed that there is little or no disability in welders who have the characteristic X-ray appearances, and that iron oxide alone does not cause fibrosis of the lungs.

It must be remembered, however, that electric-arc welding is no longer the relatively simple process it once was. In its early days it was done with bare wire electrodes on ferrous metals, and the fume produced consisted almost entirely of iron oxide. Now, however, though the bulk of welding is done on mild steel, alloy steels and non-ferrous metals are also welded; hence other metallic oxides are present in the fume.

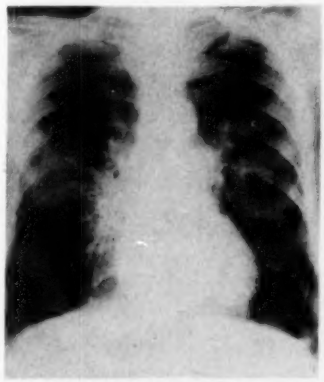

Fig. 1—Case 1: radiograph (somewhat overpenetrated) showing filling of right costophrenic angle and peaking of right diaphragm; fine nodulation of lung fields, most marked in right mid zone; linear shadows on left side not obscured by nodulation; and increased translucency at bases.

Bare wire electrodes are practically never used nowadays, coated electrodes having many advantages. The coatings act as a stabiliser of the arc, a flux, a slag to prevent too rapid cooling, a sheath to exclude air, and a source of certain elements for the weld metal. Common constituents of the coatings include oxides of iron, titanium, and manganese; silicates (such as various clays and felspar); and carbonates of calcium and other metals. The resultant fume is therefore of complicated composition, and iron oxides may constitute a relatively small proportion of it. According to Thrysin et al. (1952) a typical fume, when steel is being welded with neutral coated electrodes, may contain 30–60% of iron oxide, but with basic-coated and other special-purpose electrodes the iron-oxide content may be as low as 16%.

Other common constituents include silicates and the oxides of titanium, manganese, and calcium. The form in which silica exists in the fume does not appear to have been accurately determined, but according to Tebbens and Drinker (1941) crystalline silica is absent. It is believed that, at the temperature of the arc, any free silica that might be produced would combine with the oxides present to form silicates.

Silica and other dusts may arise from extraneous sources. For instance, electric-arc and carbon-arc welders and oxyacetylene burners or cutters working in the fettling-shops of foundries and, less often, in engineering-shops, where castings are cleaned, are exposed to the dust of free silica in the atmosphere of these shops.

Harding et al. (1950) described the pathology of the lungs of a carbon-arc welder who had worked in a steel fettling-shop. The lungs showed areas of mixed-dust fibrosis, and in the hilar glands were well-marked silicotic nodules.

McLaughlin and Harding (1956) described the necropsy and other findings in 5 welders and oxyacetylene cutters employed in iron or steel foundries for ten to thirty-seven years (average 21·2 years). Slight mixed-dust fibrosis was present in the lungs of 3 of these men but was not a factor in the death of any of them.

Charr (1955, 1956) has described the pathology of the lungs of 4 welders: 1 a complete necropsy and the 3 others lung biopsies. He showed that there was slight fibrosis in relation to the iron pigment in 3 of the cases.

Mann and Lecutier (1957) found emphysema and loss of elasticity in a lobe, excised because of a tuberculoma, from an arc welder of twenty-five years' experience whose X-ray film showed "an increase in the vascular markings, accompanied by a fine stippling of nodules 1 mm. in size, scattered mainly throughout the lower two-thirds of both lung fields". The emphysematous portion of the lung had 22% of ferric oxide and the tuberculous portion 13%. On the basis of this complicated case Mann and Lecutier suggest that iron oxide is not inert, and that arc welders' lung is not always innocent and reversible. Prof. J. Gough, who made a large section of the lung, found that the iron deposits were related to and a probable cause of the emphysema. But the larger iron content of the emphysematous portion of the lung compared with the tuberculous portion could equally be ascribed to lymphatic obstruction in the latter, limiting the entry of iron-dust particles into that portion.

We present here the pathology of the lungs of 4 electric-arc welders and 1 oxyacetylene cutter or burner who, so far as we could determine, had not worked in foundries or been exposed to the dust of free silica in other industries. In 2 of the electric-arc welders slight mixed-dust fibrosis was found; and in the other 2 there was no fibrosis, though 1 had been exposed to welding fume for forty-two years before he died as the result of an accident.

Case-reports

Case 1.—An electric-arc welder, who was 69 when he died in 1956, had always worked in engineering-shops, never in foundries. He started welding in 1914, and after 1917 always used coated electrodes usually wrapped with asbestos. He gave up welding in 1943 (after twenty-nine years) and became a club steward; he gave up all work in 1950 because of cough and dyspnœa. He was examined by a pneumoconiosis medical panel in 1950 and in 1953 and was judged to have pneumoconiosis and severe emphysema, but his total disablement was considered not to be due to pneumoconiosis. Radiography of his chest (fig. 1) on April 6, 1955, showed that his skeletal and

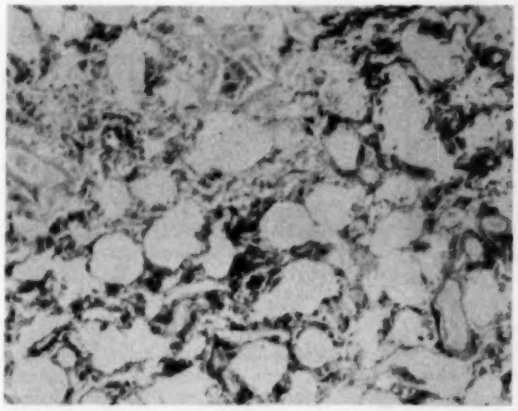

Fig. 2—Case 1: emphysema; accumulations of dust in alveolar and bronchial walls. (Hæmatoxylin and eosin. ×25.)

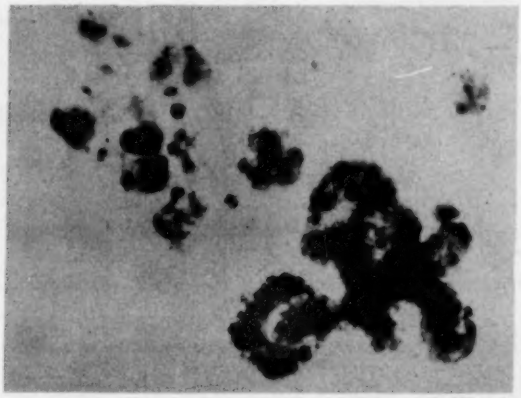

Fig. 3—Case 1: "curious body" in lung (probably an aggregate of cells containing hæmosiderin). (Hæmatoxylin and eosin. ×680.)

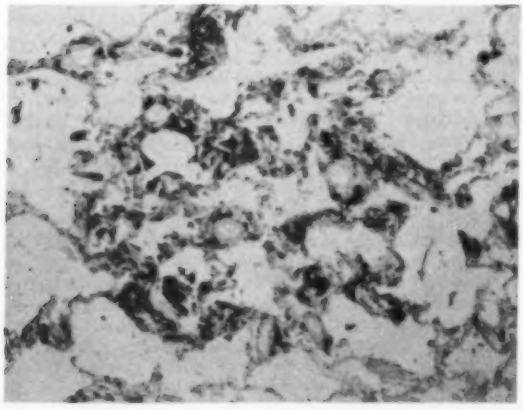

Fig. 4—Case 1: early nodule of mixed-dust fibrosis. (Hæmatoxylin and eosin. ×50.)

heart shadows were normal; his right costophrenic angle was filled, and there was peaking of the left half of his diaphragm. His lung fields showed fine nodulation, more marked in the right mid-zone; the linear shadows on the left side were not obscured by the nodulation. Over the lower lobes there was increased translucency suggesting emphysema.

Necropsy findings.—The local pathologist reported that death was due to congestive heart-failure following cor pulmonale due to chronic bronchitis, emphysema, and pneumoconiosis. A claim for compensation was allowed. When we received the lungs they had been considerably cut both before and after fixation, and it was not feasible to reconstruct them. The pleura was thickened over most of the lungs, which were uniformly black. Generalised emphysema made it difficult to determine whether there was also any focal emphysema. Some portions, probably basal, felt fairly uniformly solid, probably from congestion and œdema. A few tiny black nodules or bands were palpable. The bronchi were thick-walled, and many were filled with mucopus. Microscopically there was general emphysema, but it was impossible to distinguish focal emphysema (fig. 2). There were severe congestion, moderate œdema, and purulent bronchitis but no evident bronchopneumonia. Most of the alveolar walls were thickened, largely by œdema. A large amount of brown or black pigment was present, much of it giving a prussian-blue reaction for iron. Pigment in intra-alveolar phagocytes appeared brown; in the alveolar walls and in small aggregates around vessels it appeared mainly black. The brown pigment was aggregated in cells arranged in clusters, some having the appearance of irregular dumb-bells; others had a swastika-like design (fig. 3). Some workers call these "pneumoconiosis bodies", but it is debatable whether or not they should be regarded simply as hæmosiderin-containing cells. These clusters of cells were widely distributed throughout the lung tissue and were not only alveolar. A few spidery nodules of mixed-dust fibrosis about 1 mm. across and showing collagenous fibrosis were found (fig. 4). Incinerated sections showed that most of the pigment was, or contained, iron; no quartz was seen in acid-treated incinerated sections. Chemical analysis of the lung gave, as percentages of dried weight, ash 11, silica 0·2, iron (as ferric oxide) 7·4.

Fig. 6—Case 3: whole section of lung (half actual size).

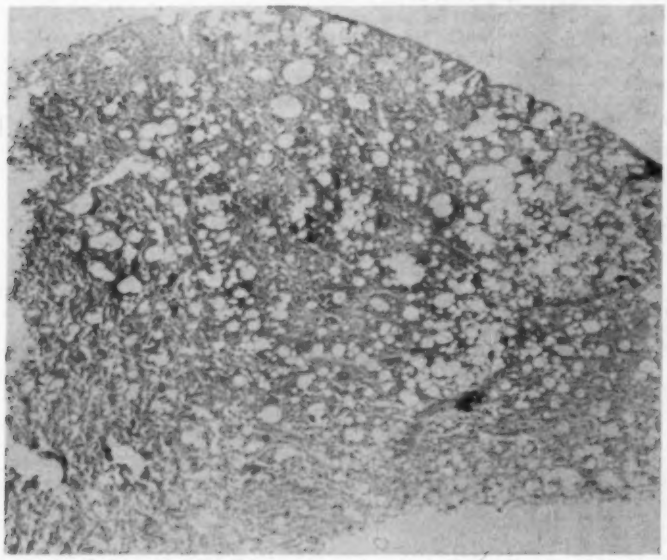

Fig. 5—Case 2: no fibrosis; very little dust. (Hæmatoxylin and eosin. ×7.)

Comment. — Although pneumoconiosis was accepted by the pneumoconiosis medical panel as a factor in this man's death, we do not consider that there was sufficient fibrosis to produce disability or to play any part in his death. Possibly his chronic bronchitis and emphysema were partly occupational in origin.

Case 2.—A man, aged 56, had been an electric-arc welder all his working life, engaged principally on ship construction and repair. His health had always been good, and he was never absent from work in the last thirteen years of his life. Radiography of his chest in 1951 showed "no abnormal shadows". He died as a result of an accidental fall from the accommodation ladder of a ship on which he was working.

Necropsy findings.—To the naked eye the lungs showed considerable bleeding into their substance, very little black pigmentation and no evident fibrosis. Microscopically they showed much inspired blood, some local bleeding, a little black pigment, and no fibrosis

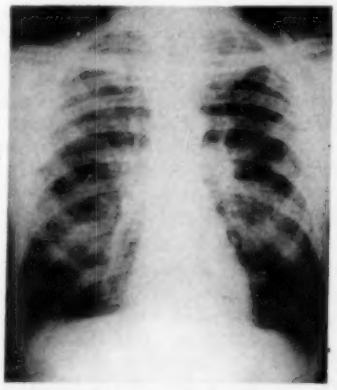

Fig. 7—Case 4: radiograph of chest showing reticulation with micro-nodulation over both lung fields, more marked in mid-zones, with linear shadows obscured by the nodulation; and some increased translucency at bases.

(fig. 5). Apart from the bleeding, this was essentially a normal lung.

Comment.—Little pigmentation and no fibrosis of the lungs were found after about forty years' electric-arc welding.

Case 3.—A man, aged 61, had been an electric-arc welder for more than thirty years for a city corporation, working mainly on tram-lines. He collapsed and died on an omnibus. After a necropsy, the cause of death was given as "myocardial fibrosis, coronary atherosclerosis".

Necropsy findings.—To the naked eye the lungs were apparently normal, apart from congestion. They showed only slight focal pigmentation and no fibrosis. The hilar lymph-nodes were slightly enlarged, black, and soft. A large section of lung showed only the slightest traces of simple pneumoconiosis and might well be accepted as normal for a man who had lived for sixty years in a dirty industrial city (fig. 6). There was slight fine emphysema, not focal in type, at the margins of the lower lobe. Microscopically the lungs showed congestion and œdema with very slight mixed-dust fibrosis. The hilar lymph-nodes showed a little fibrosis unrelated to pigment. Chemical analysis gave, as percentages of weight of dried lung, ash 3·85, total silica 0·15, free silica 0·006, and iron (as ferric oxide) 0·5.

Comment.—There was insignificant fibrosis after more than thirty years' welding.

Case 4.—A man, aged 63, died in 1956. From 1907 to 1918 he served his apprenticeship as a boiler riveter and worked casually on ship-repair work as such until he changed over to electric welding in 1918. From 1918 to 1926 he worked on board ships, using covered rods and never doing any carbon-arc welding or gas welding. For the next ten years he was a welder of boilers, and about 80% of his time would have been spent in enclosed spaces, the only precaution against fumes being the use of a compressed-air pipe to ventilate his working-compartment. For the next ten years he worked to a greater extent on ship repairs, and probably only 50% of his time would have been in enclosed spaces. A lot of the work would have been on painted metal, and less than 5% on galvanised metal. In general the welding would not have been of heavy type; the usual current would be 200 amp., with a maximum of 300 amp. and the average thickness of the electrodes would be 6-gauge.

He had pleurisy at the age of about 13 years. For the last ten years of his working life he had bronchitis and had been off work several times. In January, 1946, he was off work for three weeks with bronchitis; he returned to work for four days and was then ill with pneumonia. He had not worked since. He made a claim to the Silicosis Board in November, 1946, and was examined by the panel in January, 1947. The clinical findings then were those of an unresolved pneumonia at the right base. There was no clubbing of the fingers, and his general condition and exercise-tolerance test were considered sufficiently good for him to do light work. A certificate was refused. Radiography in 1947 showed normal skeletal, heart, and diaphragm shadows and no increased hilar shadows; reticulation with a micronodulation throughout both lungs, mainly in the mid zones; and increased translucency at the bases suggesting emphysema. Another radiograph (fig. 7), taken in 1954, showed no alteration in the picture.

Necropsy findings.—Dr. D. M. McClure reported: "Dense pleural adhesions are present on both sides. The lungs are fairly bulky, and show well-marked vesicular emphysema without the formation of large bullæ. On section the lungs show fine diffuse nodularity of fibrous type. These fibrous nodules are very small and in no instance coalesce into large masses. At the most they are just palpable, but they are very numerous and uniformly distributed in all areas. The picture is quite distinct from that seen in typical coalminers' pneumoconiosis, but it is none the less a process of pneumoconiotic type. Chronic bronchitis is also prominent. The cause of death was given as chronic bronchitis and emphysema associated with fine diffuse pneumoconiotic fibrosis." Sections from the lungs show generalised emphysema and probably some focal emphysema associated with small areas of mixed-dust fibrosis in which collagen is present (figs. 8 and 9).

Comment.—There was slight but definite mixed-dust fibrosis in the lungs of a man who had done arc welding for twenty-eight years, mostly in enclosed spaces. Whether this fibrosis played any significant part in his disability and death or not we consider to be very doubtful. The main, if not the sole, cause of his disability was chronic bronchitis and emphysema. Possibly these conditions may have been occupational in origin, caused by paint fumes, constituents of the rod coverings, or oxides

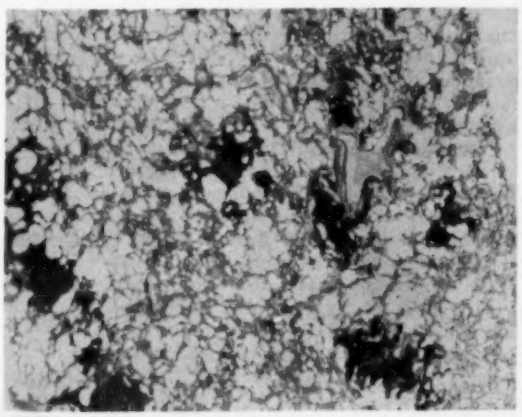

Fig. 8—Case 4: small areas of mixed-dust fibrosis; emphysema, generalised and possibly also focal. (Hæmatoxylin and eosin. ×8.)

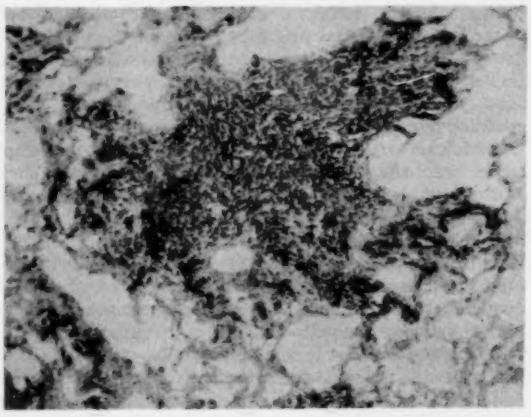

Fig. 9—Case 4: nodule of mixed-dust fibrosis. (Hæmatoxylin and eosin. ×32)

of nitrogen; but, on the other hand, they may have originated in early life, when he had pleurisy.

Case 5.—A man, aged 37, had been employed as an oxyacetylene cutter in an engineering works for six years. He then did odd jobs for six years, followed by six years in the Army, and then a further three years' cutting. He was examined by a mass miniature radiography unit about two months before his death, and " no significant change " was found in his film. He committed suicide by hanging.

Necropsy findings.—Except for some general brownness, his lungs appeared normal to the naked eye. Microscopically there were congestion and œdema, very little dust, and no fibrosis. Chemical analysis gave, as percentages of the weight of dried lung, ash 1·95, total silica 0·06, free silica 0·03, iron (as ferric oxide) 0·54.

Comment.—No fibrosis was found in the lungs of a man employed for nine years as an oxyacetylene cutter.

Discussion

It is generally believed that the inhalation of iron-oxide dust does not lead to fibrosis in the lungs or produce disability, but that the retained dust gives X-ray shadows that may be indistinguishable from fibrotic pneumoconiosis. The condition is usually called " siderosis " (Doig 1949, McLaughlin 1950, 1951). Welders and oxyacetylene cutters commonly inhale iron-oxide fume, and not infrequently show shadows in X-ray films of their lungs. However, few welders are exposed only to iron oxide: some of them work in places such as the fettling-shop, where there is a mixed silica dust produced by other operations; most of them nowadays use rods coated with various materials; the metal which they work on may not be iron or may contain metals other than iron; and if they work in enclosed spaces, oxides of nitrogen and possibly other gases may irritate the respiratory tract.

When one recalls how difficult it may be to ascertain what employment a man may have had during every part of a working life of forty or more years, and to imagine the conditions under which he may have worked many years before, it is evident that great caution must be used in interpreting the cause of any changes found in the lungs at necropsy. This, however, does not apply when the only findings are siderosis with no fibrosis or only microscopic fibrosis. In such cases one can say with confidence that iron-oxide dust has not produced any significant pathological lesion.

So far as we have been able to ascertain, none of the 4 electric-arc welders described above had been exposed to any obvious risk from silica dust, but all had used coated electrodes, and case 4 had been exposed to fumes from burning paint. Cases 1 and 4 showed very slight mixed-dust fibrosis with nodules that were just visible and palpable after twenty-nine and twenty-eight years' welding respectively; case 3 showed mixed-dust fibrosis of insignificant degree and only found microscopically after more than thirty years; and case 2 had no fibrosis after forty years' welding. In none of them do we believe that mixed-dust fibrosis was responsible for death or produced any recognisable disability.

The only oxyacetylene cutter showed slight accumulation of dust in his lungs and no fibrosis, but he had worked as a cutter for only nine years, with a twelve-year break between two periods of cutting.

We consider that it is established beyond doubt that considerable quantities of pure iron oxide can be inhaled and remain deposited in the lung tissue without producing fibrosis. Slight degrees of fibrosis may be present in the lungs of some electric-arc welders; we believe that this has not been caused by iron oxide but by other constituents of the welding fume, or possibly by some of the gases evolved. In our experience the degree of fibrosis present, even in welders with long experience, has not been sufficient to cause any disability. More severe degrees of fibrosis amounting to mixed-dust pneumoconiosis, associated in some cases with disability, have, in our experience, occurred only in welders exposed to extraneous sources of silica, such as that found in fettling-shops of foundries.

Summary

Details are given of 4 electric-arc welders and 1 oxyacetylene cutter who came to necropsy. These men had never worked in foundries or been exposed, so far as we could find out, to a silica-dust risk. 2 of the welders showed very slight mixed-dust fibrosis in their lungs; 1 only microscopically visible fibrosis; and the 4th none. The lungs of the cutter showed no fibrosis. In those cases in which emphysema was present it was not usually of the focal type.

Pure iron-oxide dust does not produce fibrosis of the lungs. When fibrosis is found in the lungs of welders and others exposed to iron-oxide dust, it is probably due to other factors, including other substances inhaled with the iron oxide.

We are indebted to Dr. A. H. Cameron for the lungs of case 1; to Dr. D. M. McClure for the necropsy report on, and for sections from, case 4; Mr. R. Conroy for the photomicrographs; and Dr. J. C. McVittie, of the Ministry of Pensions and National Insurance, for the X-ray films of cases 1 and 4 and for help in many other ways.

References at foot of next column

CONGENITAL CURLY TOES

AN INVESTIGATION INTO THE VALUE OF TREATMENT

RODNEY SWEETNAM
M.A., M.B. Cantab., F.R.C.S.
LATE ORTHOPÆDIC REGISTRAR, THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET, LONDON, W.C.1
From the Hospital for Sick Children, Great Ormond Street, and the Victoria Hospital, Tite Street, London.

DEVIATION of one or more of the middle three toes is a common congenital abnormality. The mother, anxious that her child should be normal in every way, seeks medical advice as soon as the deformity is noticed, and, according to whom she consults, she will be advised either that the toes will straighten themselves with growth or that some form of treatment is required. The treatment usually advised consists of adhesive " over-and-under " strapping connecting the affected toe to its neighbours; in this way an attempt is made to hold the deformed toe in a corrected position.

It was felt that this diversity of opinion concerning the value of, and even the necessity for, treatment warranted investigation, particularly since a thorough search of the literature revealed no account of the prognosis of this deformity either when left alone or treated. This investigation is an attempt to remedy this deficiency.

No consideration has been given to the common and well-documented condition of dorsal displacement of the little toe, in which the little toe overlies its neighbour, or to congenital hammer toe. Both deformities have already received ample attention and are well described in standard textbooks—e.g., Wiles (1955). The present investigation was concerned with congenital deviation of the third and fourth toes, more commonly the former, but occasionally

Congenital curly toes.

also the second toe. The toe is adducted and curled under its neighbour (see figure). The deformity is a mixture of adduction and flexion, mainly at the terminal joint, but also in the proximal, and is combined in the more severe cases with rotation of these joints, the nail coming to lie towards the lateral side. Commonly two or even three toes are affected, and often both feet are involved.

Trethowan (1925) described the condition in detail and believed that conservative treatment was successful " in the slighter and earlier degree of deformity " but emphasised that such treatment must be applied " with patience and assiduity ". There has been no further contribution to this subject in the English literature since then.

Investigation

The relatively trivial nature of the condition made follow-up of patients difficult, particularly because they had all been treated in infancy and could not be examined for the purpose of this inquiry until adolescence, the average age being 13.

Fifty feet were available for examination (table I); the series is almost evenly divided between treated and untreated children.

The treated children had all had the deformity held in attempted correction by means of over-and-under strapping for many months, the average being thirteen. In only three children was this treatment started after the age of 2 years.

When the children were examined in adolescence, the position of the toes was compared with the severity of the deformity when first seen, as recorded in the hospital notes. If there was any doubt whether or not there had been improvement, the mother's opinion, if definite, was accepted. Since this method of assessment was used in both the treated and the untreated children it does not detract from the validity of the results.

TABLE I—COMPOSITION OF SERIES EXAMINED

No. of children	Bilateral	Unilateral	Average age at follow-up (yr.)	Average duration of treatment (mos.)
29	21	8	13	13

TABLE II—RESULTS IN TREATED AND UNTREATED GROUPS

—	No. of feet examined	No. improved	No. unchanged
Treated ..	21	5 (25%)	16 (75%)
Untreated ..	29	8 (27%)	21 (73%)
Total ..	50	13 (26%)	37 (74%)

Results and Conclusions

In no foot treated or untreated was any deterioration in the deformity found. Growth of these crooked toes might have been expected to increase the apparent deformity, but this was not seen. The number showing improvement, about 25% of the total, was almost evenly divided in proportion to the numbers in the treated and untreated groups (table II).

Eleven children (22%) had a known close relation similarly affected. More detailed inquiry into this feature, together with examination of relations, would probably reveal a larger proportion. The lack of symptoms in most cases would be unlikely to arouse attention among members of a family.

None of the children examined had any symptom related to their curly toes; indeed the majority had forgotten that they had such an abnormality until the " follow-up " letter arrived.

This inquiry has shown that over-and-under strapping has no significant effect on the outcome of this deformity of the toes. However, since a quarter of the untreated cases improved and none of the remainder deteriorated, it is doubtful whether any form of treatment is worth while.

The follow-up was not long enough to show whether symptoms occur in later life; that they did not do so by adolescence is no criterion. However, from the relatively mild deformity and natural tendency for the toes of an adult to fit together by mutual pressure, it seems unlikely that troublesome symptoms would arise in many patients. In fact, painful conditions of such curly toes are seldom seen in an orthopædic clinic, and, in any case, if they arise, the toe can be straightened by a simple operation in the outpatient department.

Undoubtedly many parents obtain satisfaction from knowing that something is being done to correct their child's " deformity ". Perhaps this warrants recourse to treatment, but in most cases a simple explanation of the facts will save all concerned much time and valueless effort in treating a condition which requires no treatment.

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Summary

An investigation into the value of treatment of congenital " curly toes " is described.

The usual method of treatment with over-and-under strapping is both without effect and unnecessary.

This investigation was undertaken at the suggestion of Mr. G. Lloyd-Roberts and it is a pleasure to acknowledge his kind help and advice and to thank him for allowing me to examine his patients. I also wish to thank Mr. R. H. Young for permission to examine children under his care at Victoria Hospital, Tite Street; and Miss B. Kennedy, M.C.S.P., for her generous help.

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AEROPHAGY OF EFFORT

A SYMPTOM OF CORONARY-ARTERY DISEASE

GEOFFREY BOURNE
M.D. Lond., F.R.C.P.
PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL, LONDON, E.C.1.

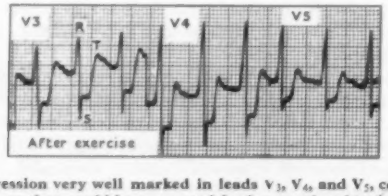
THE way to a man's heart is said to be via his stomach. Symptoms often follow the same route. Palpitation is frequently gastric in origin; angina of effort is often intensified immediately after a meal; flatulence is apt to follow the termination of an attack of paroxysmal tachycardia or indeed of anginal pain; and, finally, lesions of the œsophagus, and dysfunction of it, are known sometimes to simulate very closely the pain of myocardial infarction or of angina of effort.

Berman (1957), in a paper entitled Dyspepsia of Effort, emphasises the relationship between exercise and gastric symptoms but does not specifically refer to aerophagy, although in three instances the dyspepsia overshadowed the anginal pain.

The present case is a further gastrocardiac example of a type hitherto undescribed.

A man, aged 65, began to have typical intermittent claudication in May, 1955. Previously he had been able to walk 8–10 miles a day without symptoms. On clinical examination his cardiovascular system was normal except for a slightly raised diastolic blood-pressure (158/100 mm. Hg) and some coolness of his legs and feet. Electrocardiography showed a Q wave in leads III and VF. The T wave was flat in lead III but normal in VF. Deep inspiration diminished these abnormalities. Radiologically the heart was normal in size and shape. When he was seen in June, 1956, and again in July, 1957, his walking had improved. He was otherwise symptomless. The physical state and the electrocardiogram were unchanged.

In August, 1957, he first noticed, and complained bitterly of, belching, accompanied by a feeling of tightness in his chest. He associated the symptoms with walking and with excitement or emotion. They would come on after he had walked about 50 yards and were absent at rest. When he was examined in October, 1957, there was no change in his physical state, but he produced at intervals the noisy eruptive self-satisfying single belch of typical air-swallowing. This recurred like an infrequent minute-gun during the examination. A slight apical systolic murmur was now audible. There was no other change in his resting clinical state or in the resting electrocardiogram. An orthodiagram showed the heart to be a little larger. His œsophagus and stomach were investigated radiologically by Dr. George Simon and were found to be normal. The patient was given a carminative mixture and advised about his method of eating. The mechanism of his air-swallowing was also explained.



S-T depression very well marked in leads V_3, V_4, and V_5, considerably more than could be accounted for by associated tachycardia.

He was seen again on Nov. 18, and this time the electrocardiogram was taken both before and after exercise. Exercise produced depression of S-T from V_2 to V_5 (see figure) associated with much belching. In view of the recent onset and the increasing severity of his symptoms he was treated by three weeks' rest in bed and was given a course of anticoagulant therapy. He improved, but the symptoms persisted in a lesser degree.

The psychological background is interesting. During the first world war the patient went overseas and returned home with a functional visual disability. He was unable to face the light; and a short spell of reading made him mentally confused. He consulted several ophthalmologists both in this country and on the Continent. Mr. E. H. Cameron, of Edinburgh, reported on him on Nov. 29, 1957, as follows:

" He has been coming to see me at intervals since 1944 and has always been difficult to deal with satisfactorily. He had seen Dr. A. H. H. Sinclair here and the late Professor Ballantyne in Glasgow before coming to me, and told me that some years ago Dr. Sinclair had told him he had ' optic neuritis '. I could never myself find any abnormality about his eyes, except a low refractive error and a low hyperphoria. His corrected vision has always been 6/6 partly with each eye, and I have never been able to find any field changes. His main complaint has been reading difficulty. For this I could never find any evident cause and was forced to regard it as psychological."

The psychological factor seems to have been the link between the cardiac cause and the gastric manifestation.

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A SELF-COMPENSATING PNEUMATIC TOURNIQUET

C. S. JONES
M.B. Cape Town
A. F. GREGORY
From the Department of Anæsthesia, Groote Schuur Hospital, and the University of Cape Town

SURGERY of the limbs is greatly facilitated by the bloodless field which a tourniquet produces; this is often achieved by using the pneumatic cuff of a sphygmomanometer, particularly for surgery of the arm in adults and all the limbs of children. The ordinary sphygmomanometer tends to leak from its connections and from the deflating valve, and must be watched constantly and attended to regularly if adequate pressure is to be maintained in the cuff.

We have used the systems described herein and sketched in the diagrams and find that they keep a constant pressure in the cuff without any attention.

The simpler system (fig. 1) utilises an Adams reducing valve from an anæsthetic machine. This valve ordinarily reduces the pressure in an oxygen or a nitrous-oxide cylinder to about 4–6 lb. per square inch (which is equivalent to a pressure of 200–300 mm. Hg.) and can be set to various pressures within its working range by adjusting the tension of a spring seated against the diaphragm of the valve. This adjustment is coarse; there-

fore, if it is used for inflating a tourniquet from a cylinder of medical gas, the pressure exerted by the tourniquet is not precisely controlled. However, the volume of gas used is limited to that required to inflate the cuff and to make good any leakage from the cuff and its connections.

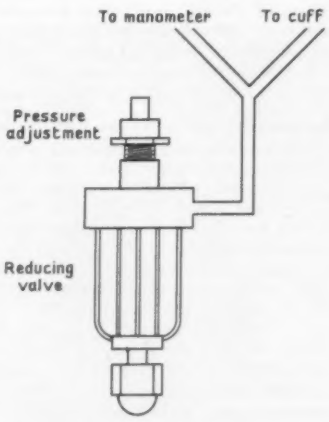


Fig. 1—The simple system with coarse pressure control and low gas consumption.

The more complex system (fig. 2) also utilises a high-pressure gas and a reducing valve, but in this instance the valve is set to deliver greater pressures, say 8–10 lb. per square inch (about 400/500 mm. Hg), and there is a constant leak built into the system between the tourniquet and the control mechanism. A constant flow of gas is led from the reducing valve to the tourniquet, the volume flow being controlled by a needle valve on the low-pressure side of the reducing valve. By balancing this flow of fresh gas against the constant leak of gas, any desired pressure can be achieved in the tourniquet, and can be maintained as long as the source of gas lasts. The gas flows are small, but much more gas is used than in the simple system. However, the pressures in the cuff can be adjusted to within 1–2 mm. Hg of the desired pressure.

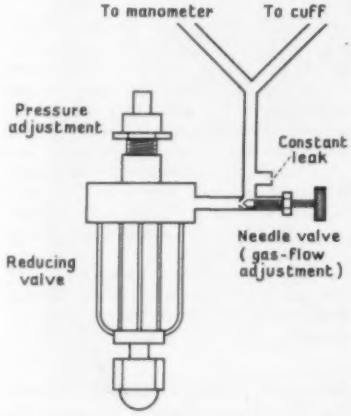


Fig. 2—The more complicated system with fine pressure adjustment but larger gas consumption.

It is advisable to use a mercury sphygmomanometer to monitor the pressures in the tourniquet; and, if the volume of mercury in the reservoir is adjusted, the manometer becomes a safety-valve as well as a measuring device, permitting gas to escape from the system if the pressure is raised to excess.

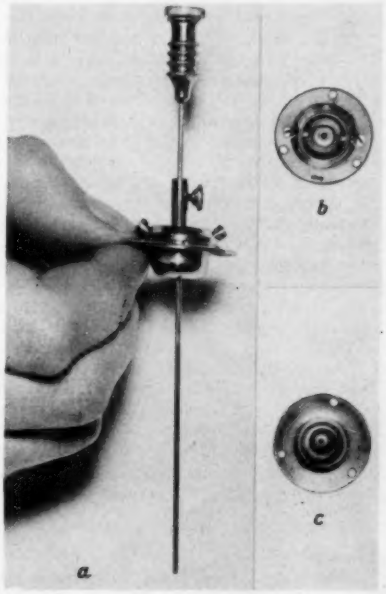
Both systems compensate for all but the grossest leaks. The constant leak also allows its system to compensate for increased pressures within the tourniquet—e.g., from a constricting towel or bandage.

Our pilot model has been in satisfactory use for 6 months.

New Inventions

CUP-AND-BALL CHEMOPALLIDECTOMY APPARATUS

CHEMOPALLIDECTOMY and chemothalamectomy are now established procedures for the treatment of selected cases of parkinsonism and other hyperkinetic disorders. Most techniques in current use are complex, tedious and time-consuming. The cup-and-ball apparatus has been designed to simplify these procedures and to save time.



***a*. Lateral view of the apparatus with the needle in place. *b*. View from above. *c*. View from below.**

As with other methods, the target (globus pallidus or ventrolateral nucleus of the thalamus) is first located by means of pneumoencephalography. A burr-hole is then made, 13 cm. from the nasion and 5 cm. from the midline, and the cup-and-ball is fixed into the burr-hole with three pins which pass through the rim of the apparatus into holes drilled into the bone. A guarded drill of smaller size than the pin is used. A brain needle is passed a short distance into the brain through the hole in the ball in the approximate direction of the target (the ball can be fixed or moved by tightening or loosening the screws). Anteroposterior and lateral X-ray films are taken and any adjustments of the direction of the needle are estimated and carried out. The needle is then pushed inwards to the correct depth and the adjustable collar is fixed by means of the thumbscrew. The distance of the collar along the needle is measured for future checking. A small quantity of procaine is injected. If the point of the needle has reached the target, contralateral involuntary movement and rigidity should be relieved or greatly reduced. The scalp is then sutured except over the centre of the ball.

As the ball is fixed by screws, and the required depth of the needle is known, the needle may be removed and replaced on subsequent occasions for injection of absolute alcohol without further radiography. When the course of injections is finished the wound is opened, the apparatus removed, and the scalp resutured.

The apparatus is made by Lewis Bros. London.

West End Hospital for Neurology and Neurosurgery, London, W.1

LESLIE OLIVER
M.B. Lond., F.R.C.S., F.A.C.S.

Reviews of Books

The Matrix of Medicine

Editor: NICOLAS MALLESON, M.D., M.R.C.P., University College, London. London: Pitman Medical Publishing Co. 1958. Pp. 234. 45s.

THE theme of this book is the interplay of medical practice with the patterns of living in our community. It seeks to explore some aspects of the social interfaces between the profession and the laity, whether the latter be the works foreman with a grouse or the anthropological studies of a nation. It is a contemporary look around by sixteen different doctors peeping over the walls of their specialties, and meditating on what they see pass by. In some respects it may be a ephemeral record, in some a renewed witness of eternal verities; for at the best it can be only a reflection of the outside world from the eyes of the sympathetic. It would be a mistake to think of medicine embedded in the social matrix in too concrete a metaphor, and the contributors emphasise the essential onward movement of the matrix and its aggregates, moving at irregular speeds and distances, more like moraines in a glacier, constantly altering each others' shapes and behaviour at the changing interfaces.

It is in this way that each of the sixteen doctors looks across his own periphery. General practice, public health, occupational health, hospital practice, and medical education, may all cherish their internal disciplines, but it is refreshing to see their exponents make a critical survey of their own impact upon the community. This is a thought-provoking series of essays, to be dipped into at quiet moments, for most of us need to hear from time to time the whisper, know thyself.

Intestinal Obstruction

CLAUDE E. WELCH, M.D., visiting surgeon, Massachusetts General Hospital, and clinical associate in surgery, Harvard Medical School. Chicago: Year Book Publications. London: Interscience Publications. 1958. Pp. 376. 79s.

IN this admirable book, Dr. Welch has achieved the laudable aim of packing a small volume with information yet making it readable. Its tone breeds confidence, for the chapters are studded with practical instructions which can come only from wide experience. In the chapter on intubation for example, the author is not content with the usual information, for he also considers the complications everybody has encountered but seldom reads about: knot formation, inability to withdraw the tube, rupture of the mercury-filled balloon are some of those mentioned. It is refreshing too to read the categorical statement that it may be very difficult to place the tip of a Miller-Abbott tube in the pylorus. There is a fine chapter on replacement therapy and a full bibliography. The book will give excellent guidance at all stages of a surgical career; and it reflects great credit on the Massachusetts General Hospital.

An Introduction to Psychopathology

D. RUSSELL DAVIS, M.A., M.D., M.R.C.P., D.P.M., reader in clinical psychology, University of Cambridge. London: Oxford University Press. 1957. Pp. 388. 30s.

AS psychologist and psychiatrist, Dr. Russell Davis is well equipped to write a book on this unsettled subject. In a revealing passage in his opening chapter he gives due weight to clinical data as sources of evidence but suggests that many difficulties now besetting psychopathology are attributable to the emphasis, in contemporary British psychiatry, on somatic manifestations and constitutional causes of mental disorder. This novel view seems at variance with the current dominance of psychoanalytic theory in psychopathology. Dr. Russell Davis depends not on the methods of psychoanalysis but on correlation and experimental procedures. His exposition is lucid and informative, and ranges widely: besides familiar themes, such as experimental neurosis and the effects of brain damage, he has chapters dealing with ecological factors, recent behaviour theories, and other biological aspects of psychopathology. He adduces much evidence from the literature of the subject but does not examine it rigorously, nor do justice to the extensive German contributions: he does not include Jaspers' unrivalled text in his list of about 300 references.

Reflexogenic Areas of the Cardiovascular System

C. HEYMANS, M.D., professor of pharmacology, University of Ghent; E. NEIL, M.D., D.SC., John Astor professor of physiology, University of London, Middlesex Hospital Medical School. London: J. & A. Churchill. 1958. Pp. 271. 56s.

THIS book is full of interesting and useful information for those who specialise in the study of the cardiovascular system and for laboratory workers concerned with the reactions of any organ, with the exception perhaps of those who study isolated tissues parted from the circulation. The reflexogenic areas are not only concentrated in the carotid and aortic regions; similar sensory endings are distributed widely. The reader is reminded too of the considerable activity of veins, both large and small; their supply of muscle may appear meagre, but the pressure against which the muscle must contract is low. The importance of constriction of the veins probably lies in the modification of venous capacity, rather than in changes of resistance to flow.

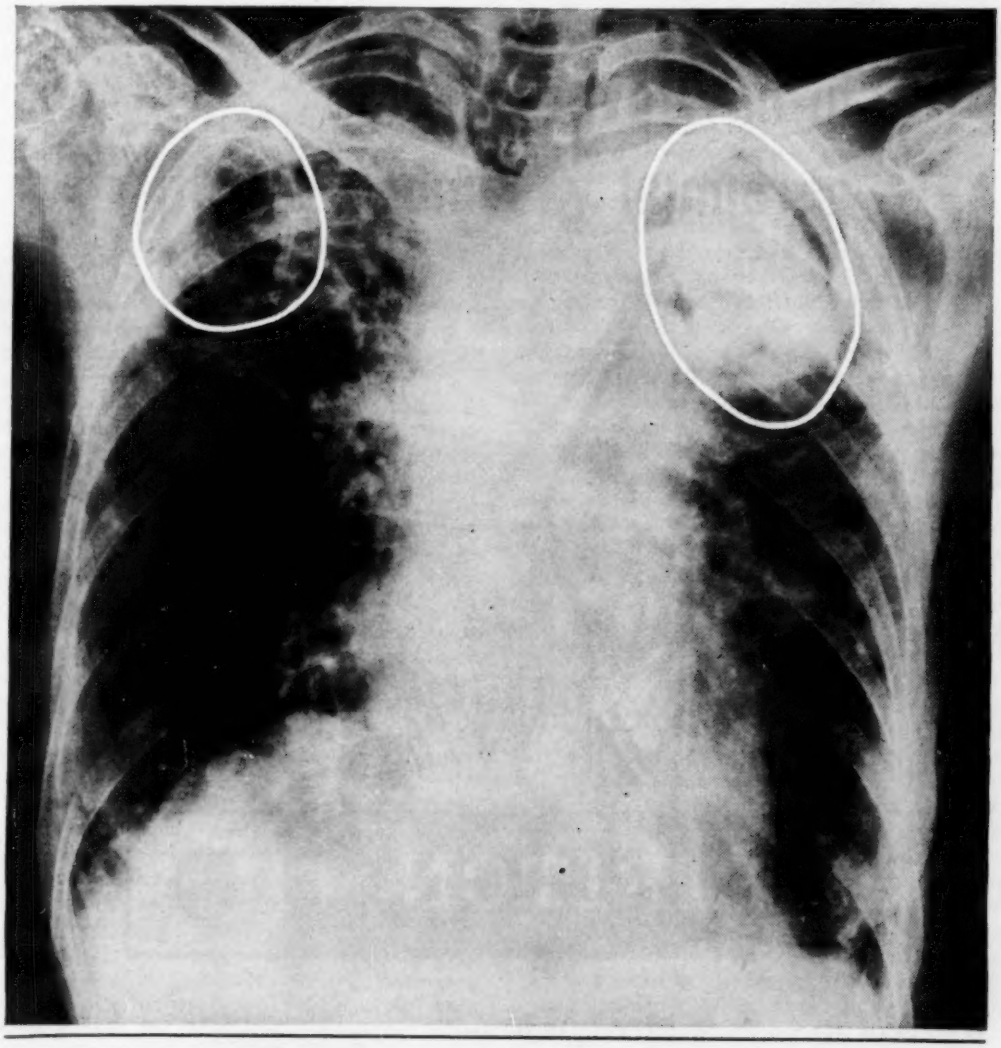
The first section of the book concerns the arterial baroreceptors, and the second the chemoreceptors; and each section begins with an account of the minute anatomy of the sensory areas. A third section is devoted to the cardiopulmonary reflexes. The subjects are discussed from every angle: methods of study; general effects of stimulation; the local effects in organs of the general vascular response; the effects of anæsthetics and other drugs; and similar reflexes arising in parts other than the circulation.

It is clear that the chemoreceptor system has many facets of interest. It is of direct importance in all considerations of respiratory control, whether in eupnœa, exercise, hypercapnia, or anoxia. Thus this part of the book will appeal to the specialist in respiration, and so too will the third section.

Although the baroreceptors directly affect the circulation and the chemoreceptors more directly concern respiration, one system cannot be affected without modification of the activity of the other and this mutual interdependence is discussed. A small section is concerned with work on the still ill-understood volume receptors. The last chapter is a miscellany of cardiovascular reflexes of uncertain origin.

The condition of the circulation affects the responses of all organs, and the chances are that many workers not directly concerned will find here references or information useful to them, as well as judgment, sometimes sharp, of published work.

Blood Groups in Man (3rd ed. Oxford: Blackwell Scientific Publications. 1958. Pp. 377. 42s.).—The new edition of this now standard textbook by Dr. R. R. Race and Miss Ruth Sanger is actually a few pages shorter than the 1954 edition. The text and bibliography have been thoroughly revised and some chapters have been rearranged. A new chapter deals with the blood-groups of twins. There has been much progress in four years, and new sections are devoted, for example, to the phenotype A_2 and to the surprising amount of new work on the ABH antigens. The authors keep to the CDE notation of the Rh blood-groups and do not think that E. B. Ford's new system of nomenclature can yet be applied in this field. Wiener's corresponding symbols are collected in a table for those who wish to use them, and this avoids repetition in the text. Race and Sanger now think that "it looks as if we are nearing the end of the blood-group systems which can be detected by the tests in use up to now". New antibodies are being found to belong to one of the nine established systems. Race and Sanger think this is a gloomy prospect, and from the geneticist's point of view they may be right; but the pathologist will surely be cheered by the prospect of some limit to his labours. This third edition remains an indispensable survey of everything about blood-groups in man.



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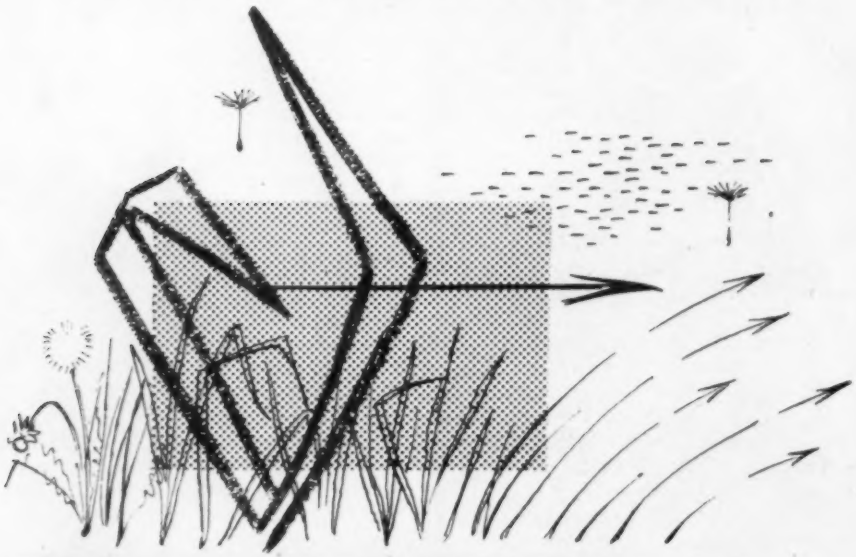

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"Liver Function"

LIVER function is usually assessed satisfactorily by clinical methods. Deterioration in general health is perhaps insufficiently recognised as an indication of progressive damage in chronic liver disease; ascites, jaundice, or neuropsychiatric disorder imply a poor prognosis unless they follow acute or potentially reversible lesions. Associated stigmata of liver disease or portal hypertension support the diagnosis, but they indicate less reliably the severity of the process or the prognosis. Clinical judgment can be reinforced by various biochemical investigations known, sometimes incorrectly, as "liver function tests". Admittedly these have certain disadvantages—notably their lack of specificity and the fact that the functions tested seldom fail simultaneously—but they are invaluable when selected discriminately in relation to specific clinical problems. Such problems include particularly the differential diagnosis of jaundice or hepatomegaly, the confirmation of suspected liver damage and quantitative assessment of its degree, and, less commonly, estimations of specific metabolic functions.

The standard battery of tests includes the determination of serum-bilirubin, alkaline phosphatase, and protein levels, and one or two flocculation tests, which are evaluated in conjunction with the clinical findings and examination of urine and fæces.[1] The relative clinical significance of direct ("post-hepatic") and indirect ("pre-hepatic") fractions of serum-bilirubin, shown originally by the van den Bergh test, in differentiating obstruction from liver-cell damage (or hæmolysis) when both are present has been known for some time.[2] BILLING et al.[3] have now shown that the diazo reaction reflects the conjugation by the liver of alcohol-soluble "indirect" bilirubin, produced by the reticulo-endothelial system, to form water-soluble mono- and di-glucuronides—a reaction which is reversed by β-glucuronidase. Bilirubin itself, being soluble in fat and alcohol, may affect the nervous system in neonatal hæmolytic disease but does not cross the glomerular membrane into the urine. In contrast, circulating di-glucuronide is increased in obstructive jaundice and, being water-soluble, appears in the urine. This work ends the long controversy regarding bilirubin metabolism and its relationship to the diazo reaction. Fractional determination of bilirubin pigments enables the uncommon familial jaundices of the Dubin-Johnson syndrome to be clearly distinguished from Gilbert's disease, and is likely to be applied usefully as a test of liver function. The source and metabolic pathways of alkaline phosphatase are less certain, but blood-levels of more than twice normal are to be expected in biliary obstruction; and levels are commonly raised in liver-cell disease, including carcinoma, amyloid, and other infiltrations. Albumin is produced solely by the liver, and its level in the serum is often depressed in liver disease; but the level is also influenced by malnutrition and alterations in the volume of extracellular fluid. Changes in serum-globulins are a feature of both obstructive jaundice and liver-cell disease, and electrophoresis differentiates the $\alpha_2\beta$ pattern of obstruction from the increased γ-globulin of hepatocellular damage. As such findings probably reflect the activity as well as the severity of the lesions, and, as they are liable to alterations due to extrahepatic disease, they are not by themselves a reliable indication of functional status. These considerations apply equally to the various flocculation and turbidity tests which reflect changes in the serum-globulins. The choice from the many reactions available is largely determined by personal preference and experience. Kunkel's zinc-sulphate test and the thymol test, which depend mainly on increases of γ or β plus γ-globulins, are widely used. SELLEK and FRADE[4] have developed a simple and rapid flocculation test using copper acetate, with results that appear very satisfactory and which are comparable to those found with the thymol test.

Sometimes, despite these and other investigations, the diagnosis remains uncertain and liver biopsy may then be indicated. The procedure is safe in the non-jandiced patient and may be preferred to laparotomy in the presence of jaundice, provided that no defect in blood coagulation can be demonstrated. In the attempt to differentiate hepatitis with intrahepatic obstruction from extrahepatic obstructive jaundice, equivocal clinical and biochemical evidence is often found to be associated with indecisive histological features. Under such circumstances, an unnecessary laparotomy may sometimes be avoided by a diagnostic trial of steroid drugs or corticotrophin.[5] When a dramatic and continuous fall in serum-bilirubin level ensues hepatitis may be diagnosed,[6] but the result is often non-specific because the jaundice may decrease somewhat in extrahepatic obstruction.[7] If jaundice persists for some weeks laparotomy (with arrangements for surgical cholangiography) is usually necessary.

When standard liver-function tests show no abnormality, additional investigations may establish the presence of liver disease and enable the liver damage to be estimated quantitatively, especially when progress is being followed. Injected bromsulphthalein (B.S.P.) is cleared from the circulation principally by the liver, and the amount of dye retained 30–45 minutes after the injection has been regarded for many years as a sensitive index of liver function. More recently the estimation of transaminases, which are released into the blood from damaged cells, has been shown to reflect the presence

1. Maclagan, N. F. Biochemical Disorders in Human Diseases. London, 1957.
2. Watson, C. J. *Ann. intern. Med.* 1956, **45**, 351.
3. Billing, B. H., Cole, P. G., Lathe, G. H. *Biochem. J.* 1957, **65**, 774.
4. Sellek, A., Frade, A. *Rev. cubana Lab. clin.* 1957, **11**, 58.
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6. Summerskill, W. H. J. *Proc. R. Soc. Med.* 1958, **51**, 363.
7. Katz, R., Ducci, H., Alessandri, H. *J. clin. Invest.* 1957, **36**, 1470.

and degree of liver damage.[8] Serum-glutamic-pyruvic-transaminase (S.G.P.T.) seems to be more specific for liver damage than serum-glutamic-oxalacetic-transaminase (S.G.O.T.)[9,10]; but both tests are affected by cell damage in other viscera, and levels may be high even in obstructive jaundice. Nevertheless, transaminase estimations are likely to prove important additions in most biochemical laboratories, especially as they can also be usefully applied to the diagnosis and management of disease of the heart and other organs. Unlike the B.S.P. test, transaminase estimations are valid in the presence of jaundice, but normal results may be found with both methods in patients with compensated liver disease.

In view of the multiple functions of the liver it is not surprising that a remarkable number of other tests have been devised to reflect various derangements of hepatic metabolism.[11] The majority have been abandoned because of their uncertain relation to the clinical condition, or because of the elaborate techniques that are involved, while others await full evaluation. The increasing availability of isotope techniques has given rise to the combination of rose-bengal with ^{131}I,[12] and preliminary studies have shown the expected delay in uptake or excretion in patients with liver disease or obstructive jaundice. Many tests have provided basic physiological data which have been applied usefully to the treatment of disease. This is particularly true of studies by catheterisation of the hepatic vein,[13] which are yielding more accurate information than is obtainable with peripheral-blood measurements regarding splanchnic blood-flow, hepatic oxygen utilisation, and the metabolism of proteins and carbohydrates by the liver. This "great, dull bile producer" is now known to perform more complex and vital functions than any other organ, and modern techniques promise that the comparatively scanty information regarding hepatic physiology will rapidly increase.

Pharyngeal Diverticula

USUALLY a pharyngeal diverticulum manifests itself when the patient is in late middle age. Such diverticula are usually ascribed to neuromuscular incoordination, with the cricopharyngeus muscle contracting actively against the bolus as it is propelled downwards.[14] But KORKIS,[15] in an analysis of 19 cases, notes that this hypothesis does not explain several clinical features: after operation the condition is cured while the alleged cause persists[16]; there is often no dysphagia in the earliest stages while the diverticulum is forming, and cases of symptomless pharyngeal pouches have been described; a positive family history[16,17] and association with multiple diverticula[17,18] and with multiple herniæ[15,18] have been noted; longstanding stenosis in the region of the cricothyroid only exceptionally results in the development of a pouch; and, finally, although dysphagia is much commoner in middle-aged women, pharyngeal diverticula develop about four times as often in males as in females. KORKIS therefore considers that other factors must operate in addition to neuromuscular incoordination. He believes that a congenital defect of the inferior constrictor at the potential site of herniation, which gives rise to a diverticulum only in the presence of an obstructive factor, is a necessary precursor; the obstruction may be due to neuromuscular dysfunction or organic disease. Of KORKIS' 19 cases 3 were associated with bulbar palsy, 2 with stenosis after a foreign body in the cervical œsophagus, and 1 with parapharyngeal fibrosis after a peritonsillar abscess; in a further 3 cases there was evidence of pulmonary fibrosis.

In the early stages, when there is merely a hold-up in swallowing, simple dilatation of the cricopharyngeal area gives at least temporary relief. NEGUS[14] recommended dilatation with a hydrostatic bag, and reported the subsequent disappearance of small but definite pharyngeal diverticula. Advice concerning suitable diet, and especially the addition of iron when required, is important.

The treatment of the established pharyngeal pouch, which is causing serious obstruction by direct pressure on the œsophagus, has been debated since LUDLOW[19] of Bristol first described the condition in 1769. WHEELER[20] of Dublin performed the first successful excision of the sac in 1885. Total removal of the diverticulum carried a high mortality due to sepsis, and the two-stage operation described by GOLDMANN[21] in 1909 was widely adopted; it is still practised in some centres of renown.[22] Other forms of external operation designed to invert the pouch[23] or to sling it up[24,25] have been given up owing to recurrences. HARRISON[26] has recommended division of the cricopharyngeal sphincter followed by inversion of the sac in early cases before the pouch comes into close contact with a comparatively large area of the œsophageal wall. (Division of the cricopharyngeus has proved successful in the treatment of dysphagia due to poliomyelitis[27,28]. In 1917 MOSHER[29] described the endoscopic division of the party wall between the œsophagus and the diverticulum by scissors, without the aid of diathermy or antibiotics; no complications occurred in the 6 reported cases[30] but in a later case of his the patient died of mediastinitis. DOHLMAN[31] has used diathermy to divide the opposing walls between the pouch and œsophagus, including the cricopharyngeus, in over 80 cases, with neither mediastinitis nor other serious

8. Wroblewski, F., La Due, J. S. *Ann. intern. Med.* 1955, **43**, 345.
9. Wroblewski, F., La Due, J. S. *Proc. Soc. exp. Biol., N.Y.* 1956, **91**, 569.
10. Pyrse-Davies, J., Wilkinson, J. H. *Lancet*, 1958, i, 1249.
11. See Sherlock, S. Diseases of the Liver and Biliary System. Oxford, 1958.
12. Brown, C. H., Glasser, O. *J. Lab. clin. Med.* 1956, **48**, 454.
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17. Björk, H. *Acta otolaryng., Stockh.* 1952, **42**, 202.
18. Solis-Cohen, L. *Amer. J. Roentgenol.* 1956, **75**, 242.
19. Ludlow, A. Medical Observations and Enquiries by a Society of Physicians in London, 1769; p. 85.
20. Wheeler, W. I. *Dublin J. med. Sci.* 1886, **82**, 349.
21. Goldmann, E. E. *Beitr. klin. Chir.* 1909, **61**, 741.
22. Lahey, F. H., Warren, K. W. *Surg. Gynec. Obstet.* 1954, **98**, 1.
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24. Schmid, H. H. *Wien. klin. Wschr.* 1912, **25**, 487.
25. Hill, W. *Brit. med. J.* 1926, ii, 1163.
26. Harrison, M. S. *J. Laryng.* 1958, **72**, 523.
27. Kaplan, S. *Ann. Surg.* 1951, **133**, 572.
28. Hoover, W. B. *Ann. Otol. (St. Louis)*, 1955, **64**, 874.
29. Mosher, H. P. *Surg. Gynec. Obstet*, 1917, **25**, 175.
30. Mosher, H. P. *In* The Nose, Throat and Ear and their Diseases (edited by C. Jackson and C. M. Coates); p. 1059. Philadelphia, 1929.
31. Dohlman G. *Int. Congr. Otol.* 1949 **2**, 715.

complications; the disturbance to the patient was insignificant and postoperative discomfort slight. DOHLMAN'S [18] œsophagoscope has a jaw-like slit in the distal end to fix the common wall, and acts as the second electrode while the diathermy forceps are used to perform the operation by stages. Two to three interventions at about fortnightly intervals are usually sufficient to give lasting relief. HARRISON [13] obtained good results in his series of 17 patients and found the operation particularly useful in the elderly.

In the majority of cases, by the time the patient is seen by the surgeon, the pouch has reached a considerable size and symptoms are pronounced. Total one-stage resection of the sac with careful repair and antibiotic cover is usually regarded as the treatment of choice in reasonably fit patients. There is a place for diathermy division of the septum between the diverticulum and the œsophagus, especially in the frail, ill, and elderly patient; but this should not be undertaken by the occasional œsophagoscopist, and it is no substitute for diverticulectomy, which obviates the necessity for repeated admissions and the risks (admittedly small) of infection, hæmorrhage, or malignancy supervening in the remaining pouch. With modern surgical and anæsthetic methods, ever fewer patients are unsuitable for a single-stage excision of a pharyngeal pouch.

Annotations

PROGRESS IN RESEARCH

FROM the many research studies which the Medical Research Council supports, some each year are selected for review in its annual report. Each report thus contains a small collection of authoritative essays, which are readable and up to date and do not confine themselves to work done under the Council's auspices. Because the essays could obviously be read with advantage and pleasure by a great many people—especially practising doctors—who would not normally buy the full report, the Council has once again had them reprinted, under the title of "Current Medical Research." This year's issue [1] covers the following fourteen topics:

- The Architecture of a Protein Molecule
- The Development of Respirators [2]
- Influenza in 1957
- "New" Viruses of the Respiratory and Intestinal Tracts
- Viral Interference and the Substance "Interferon"
- The Changing Pattern of Serological Tests for Syphilis
- The Spinal Cord in Poliomyelitis
- Community Surveys in the Study of Rheumatoid Arthritis
- The Mechanism of Fever
- 5-Hydroxytryptamine (HT)
- Female Sex Hormones and their Quantitative Estimation
- Experimental Studies on Radiostrontium
- Experimental Leukæmia
- Genetics of Eye Disease

More detailed and comprehensive information about the work now proceeding with the Council's help will be found in the report itself.[3] In the year 1956–57, ended last September, its establishments consisted of the National Institute for Medical Research, the M.R.C. laboratories in the Gambia, 44 research units, and 21 research groups, and it was also supporting research at cancer institutes. From public funds in the financial year 1956–57 it spent £2,541,549 on ordinary account and £51,230 on non-recurrent account, compared with £2,325,430 and £76,226 in the previous year. Of this money 19·6% was spent on the National Institute for Medical Research, 58·8% on research units, groups, and external staff, 7·8% on special grants, and 8·7% on temporary research grants and training awards. The income from benefactions, which are gratefully acknowledged, was £115,785. For the financial year 1957–58 Parliament voted a grant-in-aid of £2,680,500, a supplementary grant-in-aid of £95,000 (necessitated by pay awards and other obligatory commitments arising during the year), and £37,500 on non-recurrent account. The cost of the Public Health Laboratory Service, which is administered by the Council, is met separately by the Ministry of Health.

1. Current Medical Research. H.M. Stationery Office. 1958. Pp. 54. 3s. 6d. Obtainable from H.M.S.O., York House, Kingsway, London, W.C.2, or through any bookseller.
2. This essay was reviewed in our leading article of Aug. 9, p. 305.
3. Report of M.R.C. for year 1956–57. H.M. Stationery Office. Cmd. 453. 13s.

The members of the Medical Research Council are:

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THE CHRONIC RESPIRATOR PATIENT

OF late years the treatment of patients with respiratory paralysis from whatever cause has progressed remarkably; and as a result patients with poliomyelitis have survived very severe attacks but have been left with permanent respiratory weakness. The total number is not large, but it will increase each year until vaccination against poliomyelitis is available to those beyond adolescence, for it is in young and middle-aged adults that poliomyelitis is most severe and leaves most permanent damage. Despite the relatively small number of these patients, they constitute an important clinical and administrative problem, for they make heavy demands on nursing and medical staff.

Dooley [1] has reviewed the long-term care of patients who require artificial aid to respiration, basing his figures on a review in Britain in June, 1956. At the upper end of the scale are those who need assistance with respiration for part of the day or perhaps only at night; and Dooley records such a patient who was a house-physician in a London teaching hospital, travelling about the hospital in an electrically operated chair. For this type of patient a cuirass or a breathing-jacket is excellent, the principal disadvantage being that some patients find them irremediably cold. For the most severely paralysed—those who at best can breathe unassisted for a few minutes—the cuirass and the breathing-jacket are not suitable, and these patients are either nursed in a tank respirator or have a tracheotomy and are given artificial respiration by intermittent positive pressure. In either case their spontaneous breathing may be much improved by glossopharyngeal ("frog") breathing. Even if these patients have very little power in their limbs it is quite wrong to suppose that nothing can be done for them. With suitable apparatus they can read, turning over the pages with an electric switch operated, if necessary, by the chin. Electric typewriters are so light to operate that those with

1. Dooley, D. *Mon. Bull. Minist. Hlth Lab. Serv.* 1958, **17**, 124.

very weak upper limbs can use them, and if even this is not possible they can be operated by a rod held in the mouth. Quite ambitious pictures have been painted with a brush held in the mouth.

Such patients can be treated at home provided that they can be supervised, and the ability to go about the outside world in general and home in particular provides a greater boost to their morale than anything else. There are some differences of opinion on how this is best achieved. Undoubtedly, if a patient has a tracheotomy in the acute stage it should be closed when he recovers enough power to breathe spontaneously for several hours a day. But it is less certain whether tracheotomies should be closed in those who remain permanently with complete, or very severe, respiratory paralysis and can breathe spontaneously for only a few minutes. One policy is to close the tracheotomy and treat the patient in a tank respirator; the advantage of this lies in the reduced risk of pulmonary infection. The alternative is to maintain the tracheotomy, giving artificial respiration by intermittent positive pressure; the danger of pulmonary infection may be counterbalanced by the greater ease of treating this, since secretions can so readily be aspirated from the chest. The question is still unresolved, but possibly the decisive factor will be mobility. Although it is possible to travel extensively in a tank respirator it is by no means easy to do so, and air travel is virtually excluded. With intermittent positive-pressure respiration, on the other hand, a respirator which has a 12-volt motor, such as the Radcliffe Respiration Pump, can be housed with an accumulator that will last 24 hours on a shelf attached to the back of a wheelchair. This enables the patient not only to get about in the neighbourhood of his home or hospital, but even to visit places of entertainment. The ease with which such patients can travel by air has been demonstrated when Britons who have contracted poliomyelitis in Africa or the Far East have been flown to England.

When a patient with respiratory weakness leaves hospital it is essential that he should know where to turn for immediate help if he gets into difficulties of any kind. In most parts of the country there is a service for bringing to hospital people with acute respiratory paralysis, and usually these teams are most suitable for giving assistance also to more chronic patients.

TREATMENT OF RHEUMATOID ARTHRITIS WITH GOLD

THIRTY years after the first account of the use of gold salts in the treatment of rheumatoid arthritis [1 2] their place is still not firmly established. Several careful studies have provided weighty evidence that gold can induce a remission; but their conclusions have not been universally accepted, and the question is now being submitted to the test of a statistically controlled clinical trial in this country.

Those who accept that gold is effective have to choose a course of treatment calculated to produce a good response with the minimum risk of toxic effects. The commonly used homœopathic doses, unlikely either to influence the disease or to produce signs of toxicity, are clearly not the solution; and a report from Philadelphia[3] supports the belief that the dosage of gold salts should be tailored to the needs of the individual patient. Starting from the premise that gold can induce a remission, but that some patients are more resistant to treatment than others, Smith et al.[3] sought to explain differences in response by variations in the rate of excretion of gold in the urine. Measurements of excretion led them to the conclusion that a predetermined dosage may fail to be effective because the patient excretes gold unduly rapidly, or may quickly lead to toxic effects if excretion is less than normal. Differences in the duration of remission are due, they find, to the same causes. Treatment must be designed to achieve an effective accumulation of gold in the body by giving a weekly dose which exceeds the amount excreted by the kidneys and by other routes. Normally patients receiving weekly injections of 25 mg. of gold secreted about a seventh of this amount in the succeeding week; one patient excreted 28% of each dose in the week after injection, and did not respond until the dose was raised to a point at which the excretion-rate amounted to only 14%.

In routine practice it is not feasible to regulate the dosage of gold by measuring its excretion, and Smith et al. suggest a method whereby the patient's response to treatment can be used as a guide. After 12 weeks on a standard weekly dose, patients are divided into those showing some improvement and those whose condition is unchanged. The former continue to receive the same weekly dose until they have been in remission for 1–2 weeks, and are then given a maintenance dose at longer intervals. The unresponsive group proceed to a higher weekly dose, and to a second division at which the favourable reactors join the maintenance programme and the remainder move to a still higher dose. Maintenance treatment is continued for an arbitrary period of 8 months. When this method was used, 82% of patients had a remission; the corresponding figures for two types of standard course were 54% and 66%. Smith et al. hope that an even higher proportion of remissions will be achieved as refractory patients receive progressively more intensive treatment.

Some years ago Lawrence[4] suggested a rather similar flexible dose scheme in which a fall in erythrocyte-sedimentation rate (or, better, in fibrinogen level) is used as a warning that the weekly dose of gold should be reduced. This is consistent with the common observation that toxic reactions follow quickly on a good clinical response. Lawrence held that the distribution of gold in the body was more important than its total concentration, believing that while the sedimentation-rate is high the skin and other potential sites for toxic effects are protected from high concentrations of gold by the readier diffusibility of the metal in areas of active inflammation and increased capillary permeability. When the disease becomes less active this mechanism no longer operates and toxic reactions become more likely. By adopting a flexible programme of dosage Lawrence reduced the incidence of stomatitis; and lesions of both mouth and skin became mild and transient rather than persistent and distressing disabilities. Both Smith et al. and Lawrence are prepared, in patients who have had toxic signs, to continue treatment with gold at a suitably adjusted dose level. After mild toxic reactions had subsided Smith et al. encountered subsequent undesirable reactions no more often than in patients treated with standard courses. Severe toxic reactions often result from failure to interrupt treatment promptly when early signs develop.

A flexible dosage programme may improve the results

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of treatment with gold; but it clearly calls for full appreciation of the principles involved, and for close supervision of patients and frequent measurements of sedimentation-rate. Dermatitis and stomatitis, quickly detected, may by prompt adjustment of dosage be reduced to trivial complications; but more dangerous complications, such as thrombocytopenia, remind us that gold is a poison still to be handled with respect.

CANCER AND SOIL

MEN have long speculated whether differences in cancer incidence might not be due in some way to the soil. As long ago as 1868, Farr and Haviland [1] examined the death-rate from cancer in England and Wales in relation to the geological map and concluded that the disease was commoner in low-lying clay areas liable to seasonal flooding by rivers, while more elevated districts, especially those with underlying chalk and limestone, tended to have low death-rates. Haviland published several papers on the "medical geography" of Britain, with particular reference to cancer, the last of which appeared in 1899.[2] Several observations by others indicated that the nature of the soil (using the term in its widest sense) influenced cancer mortality. For the most part, these studies took the form of noting villages or small towns with a higher cancer incidence than neighbouring areas. Behla [3] in Germany and Noël [4] in France concluded that cancer incidence was increased by insufficient drainage of the subsoil. Williams [5] noted that in his country practice in Anglesey cancer was much commoner in a village where the soil was "heavy" than in a neighbouring village with a sandy subsoil or a third village standing on limestone, although the inhabitants of all three were similar in diet, occupation, and habits. He deduced that "people living in clayey or retentive soils are more prone to cancer than those who dwell on porous soils such as sand or limestone".

These and other early reports have two serious weaknesses: usually it was *total* cancer mortality that was studied; and allowance was not made for differences in the age-structure of the populations compared. The study of regional variations in cancer incidence was put on a proper basis by Stocks,[6] who investigated the age-standardised mortality in England and Wales of cancer of separate sites. Great contrasts were revealed. One of the most striking concerned the mountainous areas of Wales, which seemed to show a mortality from stomach cancer three times as great as that of the chalk areas of south-east England. Following the example set by Stocks, regional variations in cancer mortality have been studied in the Netherlands, where Tromp and Diehl [7] found that municipalities situated on peaty soils had a significantly higher mortality from stomach cancer than districts where sandy soils or river-clays predominated. In a study of the incidence of cancer in Anglesey, Davies and Wynne-Griffith [8] found that stomach cancer tended to arise more commonly on those soils which show great biological activity because of an equable distribution of moisture at all seasons. These soils would tend to have a high content of organic matter. Legon [9] has compared the loss of weight on ignition (which, in the absence of calcareous matter, may be taken as an index of organic content) of samples of top soil from areas in North Wales and the Welsh Marches. He found that this characteristic varied directly with the mortality from gastric cancer.

Investigations into the relationship of soil to cancer of the stomach have now been carried a stage further. In the course of field research covering North Wales and parts of Cheshire, Stocks [10] arranged for soil samples to be obtained from the gardens of the last residence of persons recently deceased from cancer. The investigation covered the intestinal cancers as well as cancer of the breast and of the lung. In addition, similar soil samples were taken from the residences of persons who had died from causes other than cancer, in order to provide a control series. Some 1200 "cancer" soils and about 400 control samples were obtained. The region chosen is of particular interest because the unusually high mortality from stomach cancer in North-West Wales (already referred to) is somewhat anomalous. In England and Wales as a whole the disease has a substantially higher mortality in urban than in rural areas. Accordingly a lower-than-average mortality might be expected in North-West Wales. From the pattern of blood-groups, also, less gastric cancer than usual might be expected in this area, because here the proportion of group-A people is lower than average. Racial predisposition can be discounted, because persons of Welsh extraction living outside Wales are not unduly susceptible to the disease. The evidence therefore points to some local factor as being responsible for the excess mortality.

The soil analyses reported hitherto [11] have revealed two interesting associations—though at this stage these must be regarded as tentative. Garden soils from houses where a person has died of stomach cancer after fifteen or more years' residence have higher median concentrations of zinc and chromium than soils of similar gardens elsewhere in the same area where a person has died of a cause other than cancer or of cancer after residence of less than two years. Cobalt, iron, lead, titanium, and vanadium showed no statistical association with cancer, while nickel, the other trace element which was examined, showed a negative association. No explanation can be offered; but zinc is an essential element in the molecule of carbonic anhydrase enzyme and also possibly of the insulin molecule, and some early work suggests that zinc may be concerned with the glycolytic processes of tumour cells. But the zinc-cancer association, being evident in areas outside North Wales as well as in the high-cancer area, though it may eventually prove to be in some way related to the general level of incidence, cannot be held to account for the excess mortality in the region.

The association described by Davies and Wynne-Griffith may, on the other hand, prove to be the local factor which accounts for the excess, because in North Wales, but not elsewhere, the organic content of soil was related to gastric cancer but not to other cancers. Three indices of organic content were used, and all gave broadly similar results. Cancer of the stomach occurs more commonly in relation to soils with a high organic content after residence of ten to nineteen years and with moderately high content after residence of twenty years or more.

This work on soils is being pursued at the Department of Agricultural Chemistry of the University College of North Wales, where arrangements have been made to analyse a common garden vegetable grown on "cancer" and "non-cancer" soils.

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MIDDLE AGE IN NEW GUINEA

A CITIZEN of Great Britain, on reaching the age of 50, may find that since his student days his weight has gone up 15 lb., that his systolic and diastolic blood-pressures are now 25 and 10 mm. Hg higher, and that the level of cholesterol in his serum has risen by 30 mg. per 100 ml. Such a man can certainly call himself normal and claim to represent the man-in-the-street; and, if he reads medical textbooks, he will have no difficulty in finding authorities who state that these rises are physiological—whatever that may mean.

There have been several reports that such rises do not occur in some groups of men or women who lead a primitive life, for the most part unaffected by the Industrial Revolution. Some of these are based on limited observations, but Whyte [1 2] has just completed a field study in which measurements were made on over 600 natives of New Guinea. Good modern methods of measurement and of statistical analysis were used. It was found that in both men and women in New Guinea systolic blood-pressure and serum-cholesterol are unchanged on reaching middle age, but that there is a fall in diastolic pressure of about 10 mm. Hg and a fall in body-weight of about 10 lb.

The natives of New Guinea are very small, the average height of the men being only 5 ft. 1 in.; but their weights were normal for their heights, judged by the Metropolitan Life Insurance Company standards. They also appeared muscular and of good physique. This suggests that genetical rather than dietary factors are mainly responsible for their small size. The surveys were carried out in two districts—the highlands, where altitudes range from 5000 to 9000 feet, and on the coast. In both the population is sparse and the small villages widely scattered. Their diets contain little protein, the estimated intake being 30 g. a day in the highlands and 40 g. a day on the coast. Both groups consume extremely little fat, and the highlanders also have little or no salt, which those on the plains do not lack. The virtual absence of fat in the diet can probably explain the absence of a gain in weight and of a rise in serum-cholesterol as age advances. There was no difference between the highlanders and those on the coast in blood-pressure levels, despite their different salt intake; and so this study lends no support to the claim that high blood-pressure is attributable to a high salt intake. In New Guinea the people are certainly not exposed to the "stresses and strains" of modern civilisation. Whyte does not discuss their manner of living, but life is seldom easy in a primitive society and no doubt they have their worries and their emotional disturbances.

In Great Britain the increases in middle age of weight, blood-pressure, and serum-cholesterol, described above as normal, are certainly compatible with health and a long life. But larger increases are also common, and these are certainly associated with degenerative diseases of the heart and arteries. From these diseases the natives of New Guinea seem to be singularly free. Price, who has done 600 necropsies, informed Whyte that in only 1 case was death attributable to coronary-artery disease, and he found that atheroma was generally absent or very slight. Hypertension is virtually absent among these people. As Whyte remarks, the inhabitants of New Guinea lack many things—protein, fat, gross obesity, and city bustle. Probably for these reasons they seldom suffer from degenerative cardiovascular diseases; yet they also lack the comforts and amenities of civilised life and the skills and energy necessary to protect themselves against infectious diseases. To acquire these advantages man may need a lot of protein, fat, and city bustle. Perhaps we cannot have it both ways.

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PLEURAL BIOPSY

A DIAGNOSIS of tuberculous pleural effusion commits the patient to protracted chemotherapy and sets administrative wheels in motion; hence it is highly desirable to confirm this diagnosis. But since, even with the best bacteriological technique, tubercle bacilli can be grown from the pleural fluid in only some cases, pleural biopsy has been used to obtain additional information, [1–10] and Hill et al.[11] and Weiss [12] now report on the value of this increasingly popular procedure.

In 23 cases of presumptive tuberculous pleural effusion without demonstrable pulmonary disease, Hill et al. cultured tubercle bacilli from the fluid in only 4 cases, whereas investigation of biopsy material led to a diagnosis in 15 cases. In 5 of these 15 cases the diagnosis was based on the histological appearances alone; in 9 histological evidence was confirmed by culture of the tubercle bacillus; and in 1 the diagnosis was made on culture results alone. In a further 9 cases, in which there was pulmonary as well as pleural disease, biopsy was of no help; the diagnosis was established by other means in 7 cases, and pleural biopsy was merely confirmatory in 4 of these.

Weiss carried out pleural biopsy in 31 cases of presumptive tuberculous pleural effusion with or without pulmonary involvement, and made a histological diagnosis of tuberculosis in 23. Pleural fluid was cultured in 27 of the 31 cases and was positive in 16 instances; and the combined results of pleural biopsy and culture of the fluid gave positive findings in 27 of the 31 cases. Hill et al. warn that the finding of a non-specific pattern of pleural inflammation does not exclude tuberculosis, and these workers and Weiss agree that, although pleural biopsy may occasionally demonstrate a malignant pleural condition, the procedure is of value chiefly in establishing the presence of tuberculosis, as in this condition the pleura is usually very extensively involved.

Pleural biopsy may be carried out as an open operation under general or local anæsthesia, or blindly using a special needle such as a Vim-Silverman. Despite the necessity for a surgeon and an operating-theatre, Hill et al. prefer open operation under local anæsthesia to needle biopsy, because a suitable piece of pleura can be selected and enough removed to permit bacteriological as well as histological examination. Weiss, on the other hand, maintains that if thoracentesis is performed needle biopsy may as well be done at the same time and open operation kept in reserve—a reasonable opinion in view of his high proportion of successes with the simpler method.

Prof. CHEVALIER JACKSON, pioneer of œsophagoscopy and bronchoscopy, died in Philadelphia on Aug. 16 at the age of 92.

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Occasional Survey

EXERCISE-TOLERANCE TESTS

E. A. HARRIS
M.B. Lpool, Ph.D. Edin., M.R.C.P.

IMPAIRMENT of the capacity for physical exertion is a common symptom of disease. In cardiopulmonary disease it is by the severity of this symptom and its rate of progression or regression that the necessity for treatment, the type of treatment, and the response to treatment are largely judged. Assessment of the degree of impairment at any given time is usually made on the basis of the clinical history; but, valuable though the latter may be, it can never be objective, since it is influenced by the motives, personality, and intelligence of both patient and physician. The lack of objectivity is particularly regrettable when decisions for or against surgical measures such as mitral valvotomy are in the balance. In many such cases help can be obtained from cardiac catheterisation; but this is a routine procedure in only a few centres, and in any case it cannot be said to assess the patient's capacity for any ordinary activity. A reliable, simple, repeatable, and safe "exercise-tolerance test" would therefore be very useful. Despite the attention given to this question by many investigators the ideal test has not yet been realised.

Clinical exercise-tolerance tests are closely related to tests of fitness for athletic, industrial, and military purposes. In this article existing tests in all these fields are briefly surveyed. The emphasis throughout is upon tests which are relatively simply performed and therefore technically suitable for routine application. The tests so far proposed fall into three groups: (1) those based on ventilatory measurements: (2) those based on records of heart-rate: (3) those involving measurements of maximum oxygen consumption or oxygen debt.

VENTILATORY MEASUREMENTS

The Ventilatory Equivalent

When the ventilation-rate increases abnormally on exercise, as in many types of cardiac and pulmonary disease, the ratio of ventilation to oxygen uptake or to carbon-dioxide output is abnormally high. These fractions were termed the "ventilatory equivalents" (V.E.) for oxygen [1 2] and for carbon-dioxide.[3] They were originally regarded [4 5] as reflecting alterations in pulmonary blood-flow, and this view found a measure of acceptance.[6] However, the V.E. may be increased by nervous hyperventilation, by excessive ventilation of the dead space due to rapid shallow breathing,[7] and by the respiratory stimulus of metabolic acidosis, as in the lactic-acidæmia of exercise. Donald et al.,[8] for example, found no consistent relation between V.E. and pulmonary blood-flow during exercise in patients with mitral stenosis. The V.E. can be regarded as a rough index of ventilatory efficiency, but in the absence of other data it cannot be interpreted precisely.

The Respiratory Frequency

Wahlund [9] used the respiratory frequency as an index of working capacity, which he defined in this connection as the rate of work at which the frequency reaches 30 breaths per minute. This value was arbitrarily chosen as the limit of efficient respiration. Respiratory frequency is, however, a very variable function; it can be regulated consciously by the subject and is apt to be influenced by breathing apparatus in subjects unaccustomed to wearing it. Matthews [10] found the respiratory frequency to be useless as an index of exercise ability in patients with mitral stenosis.

The Hugh-Jones Test

Hugh-Jones [11] found that the ventilatory "debt" after 5 minutes' standard exercise was equal to the ventilatory "deficit" of early exercise in healthy people and in patients with emphysema who could finish the exercise. In patients who were unable to complete 5 minutes' exercise the debt exceeded the deficit and the difference was roughly proportional to disability. Stock and Kennedy [12] obtained similar results in mitral stenosis. In exercise below the healthy or emphysematous subject's aerobic capacity the debt never materially exceeds the deficit [13] and the exercise must be severe (for the particular subject) before the test begins to be "positive". It is thus a maximal test and as such may be undesirable in some conditions, though doubtless safe in emphysema. Its interpretation is also subject to the uncertainties surrounding the ventilation equivalent.

Comments

The current view of dyspnœa [14] is that it arises whenever ventilatory demand approaches the available ventilatory capacity. By measuring both of these, it should theoretically be possible to "measure" dyspnœa. The Hugh-Jones test depends partly upon ventilatory demand and supply during exercise. However, the observed ventilation during an exercise test may not be the true ventilatory demand for that rate of work, because the subject's unfamiliarity with the conditions of the test may induce unnatural breathing—usually hyperventilation but occasionally the opposite. Further, the potential candidate for industrial compensation may have a powerful motive for making himself appear as disabled as possible. Measurements of maximum ventilatory capacity too are subject to the patient's voluntary control; the resting value, moreover, does not necessarily apply to exercise. For these reasons ventilatory measurements have serious limitations when used alone as indices of performance.

HEART-RATE

The Recovery Heart-rate

(*a*) *Master's step test* [15 16] depends entirely on a single pulse-count taken sitting 2 minutes after standard exercise. Master asserted that the test would distinguish differences in disability which were otherwise undetectable. The grounds for this assertion are not clear.

(*b*) *The Harvard step test* [17] has been widely used in the athletic field and a more severe form of it (the "pack test") for military purposes. Since the recovery heart-rate curve is approximately exponential, it can be characterised if three points on it are known. The Harvard test utilises pulse-counts at 1–1½, 2–2½, and 4–4½ minutes of recovery, and these are incorporated into an index of fitness.

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Master's test has not been critically re-evaluated, but criticisms of the Harvard test should apply more forcefully to Master's. Cureton et al.[18] compared the Harvard step test with the ability to perform a variety of gymnastic and athletic feats. Their very thorough study showed a strikingly low correlation. Taylor [19] concluded that the recovery heart-rate curve is not closely related to the capacity for exercise. " It seems clear ", he writes, " that one must look to the responses *during* exercise . . . for critical measures of fitness for hard work." In the clinical field, Baldwin et al.[20] found that in pulmonary disease there was no relation between pulse-counts, taken during recovery from exercise, and disability. The causes of the raised pulse-rate after exercise are poorly understood and are probably related as much to peripheral vascular conditions, muscle tone, and posture as to cardiopulmonary status.

The Heart-rate during Exercise

The measurement of heart-rate during exercise is technically more difficult than its measurement in the recovery period, but recent developments in instrumentation [21 22] have solved most of the technical problems. Three tests have been proposed which make use of the heart-rate during exercise.

(*a*) *Wahlund's test.*[23]—The heart-rate, during the 3rd to 6th minutes of each of a number of exercises of different intensities, is counted and the heart-rate is plotted against the rate of work. The rate of work corresponding to a heart-rate of 170 beats per min. is taken as the " working capacity ". To avoid error from extrapolation the exercise must be pushed to somewhere near the " working capacity ", and this is therefore a near-maximal test. Wahlund showed clear differences between dissimilar groups of healthy subjects and patients, but the value of the test in the individual subject is hard to assess from Wahlund's data.

(*b*) *Astrand and Ryhming*,[23] having found that the heart-rate in the steady state of submaximal exercise could be correlated with the maximum attainable oxygen uptake (" aerobic capacity "), constructed a nomogram from which the aerobic capacity can be read if the work-rate (or oxygen uptake) and heart-rate are determined for a single submaximal exercise. These workers suggested a clinical application for the test because it is a submaximal one. There appears to be only a fair correlation between determined submaximal heart-rate and determined aerobic capacity, and there is much individual scatter in the published figures.

(*c*) *Müller* [24] proposed what he termed the " *Leistungspulsindex* " (L.P.I.), which consists essentially of the rate of rise of heart-rate with increasing rate of work. The absolute heart-rate reached at any exercise level is not taken into account in calculating the L.P.I. Müller showed fairly good correlation between L.P.I. and an estimate of maximum performance and also demonstrated improvement in the index during a training programme in two subjects.

It has been known for many years that " fit " subjects tend to have lower heart-rates than " unfit" subjects at the same rate of work, and also that patients with cardiac, pulmonary, and other disease respond to effort with a greater tachycardia than healthy people. The factors responsible for the tachycardia of exercise are, however, poorly defined and are therefore difficult to control experimentally. Consequently random fluctuations in these factors, while mutually compensatory when groups of subjects are compared, make individual comparisons unpredictable. There is probably more chance of error from this source when the absolute heart-rate is the criterion, as in the Wahlund and Astrand-Ryhming tests, than when Müller's L.P.I. is used. For example, an athlete showed day-to-day variations in the first two of these tests of up to 20%, whereas his L.P.I. remained almost constant.[12]

All these tests utilising heart-rate during exercise have been introduced during the last 10 years and none has yet been critically reinvestigated. Müller's test appears, a priori, to have advantages over the other two, but has never been assessed clinically. Perhaps the heart-rate tests may yet be put on a more rational basis as more is discovered about the mechanisms of the tachycardia of exercise. The findings of Harris and Porter,[25] for instance, indicate that the " heart-beat deficit " of early exercise might be developed as a possible index of performance, since it appears to parallel the oxygen debt. At present, however, no exercise-tolerance test based on heart-rate can be confidently recommended for clinical use.

MAXIMUM OXYGEN UPTAKE AND OXYGEN DEBT

Maximum Oxygen Uptake

This is the ultimate measure of the capacity of the oxygen transport and utilisation systems, and has been so recognised since the classical work of A. V. Hill and his school. The maximum oxygen uptake is different for different types of exercise and is also increased by preliminary " warming up ".[26 27] Taylor et al.[27] have proposed it as an index of cardiorespiratory performance, and for healthy subjects it is probably the best index available. Maximum oxygen uptake in exercise involving a large muscle mass is mainly limited, in health, by the maximum cardiac output.[28] Since the measurement of maximum oxygen uptake involves maximum effort it is unsuitable for clinical purposes.

Oxygen Debt

Margaria et al.[29] found that the oxygen debt after standard treadmill exercise increased in rectilinear fashion with increasing exercise up to an oxygen uptake of about 2000 ml. per min. in a healthy subject. At rates of work above this intensity the debt curve rose more and more steeply, becoming almost vertical at the limit of tolerance. The end of the linear phase corresponded to the exercise intensity above which lactate began to accumulate substantially in the circulating blood. In exercise at the same submaximal level the blood-lactate,[30] and the oxygen debt after exercise, are greater in the unfit subject. The same was shown to apply in disease of the heart and lungs by Katz et al.[31] and Nylin.[32 33] These workers devised clinical exercise-tolerance tests based on this finding.

Since significant differences in oxygen debt between

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subjects may be found at exercise intensities well below maximum levels, tests based on debt measurements are suitable for clinical use. Moreover, it would seem almost impossible for a subject voluntarily to influence his oxygen debt, and this consequently provides a truly objective measure of performance. Of all existing tests, this is the one which, from the clinical point of view, would probably most repay further study and development.

COMBINED TESTS

Composite indices have been proposed from time to time. Bruce et al.[34] developed a " physical fitness index " (P.F.I.) combining recovery heart-rate with ventilation equivalent. While they thought this index helpful in the assessment of cardiac patients for operation,[35] it seems doubtful whether the P.F.I. is fundamentally more reliable than its individual components.

DISCUSSION

The term " exercise tolerance " is often used in clinical discussions, but few attempts have ever been made to define it. Wahlund [9] used it to mean the highest exercise intensity which the subject could maintain efficiently in a steady state. But how do we recognise efficiency or inefficiency? The physiological responses to exercise, for the most part, follow a continuous gradation from the mildest exercise to the most severe, and at no point is it easy to say that exercise has become " inefficient ". Wahlund was, as we have seen, obliged to use quite arbitrary levels of heart-rate and respiratory frequency as his criteria. Alternatively we might, with Cureton et al.[18] and Taylor,[19] regard the subject's maximum performance as the only reliable criterion of his " exercise tolerance ". In clinical work this definition is unhelpful: (1) because of the risk involved in maximal exercise (one patient, at least, with mitral-valve disease, has died after exercise on a treadmill [34]), and (2) because one can never be sure of a patient's full cooperation and maximum effort. A submaximal test is needed; but submaximal tests based on measurements other than oxygen debt have the disadvantage that there is no standard against which to assess them in clinical work—except for the history (and if this were reliable and quantitative there would be no need for an objective test). On the other hand an assessment based on oxygen debt has a physiological validity which requires no comparison with other and possibly spurious criteria. The oxygen debt, indeed, is almost the only indication we have that the exercise which preceded it was " inefficient ".

The oxygen debt depends upon the adequacy of the oxygen supply to the working muscles during exercise, and is thus influenced by the oxygenation of blood in the lungs, the oxygen-carrying capacity of the blood, the cardiac output, and the state of the arteries supplying the muscles. These cover most of the causes of impaired working capacity. It is nevertheless conceivable that a person with, for instance, mitral stenosis or hypertensive heart-disease may be forced to stop exercise owing to dyspnœa from pulmonary engorgement while the oxygen supply to his working muscles is still sufficient to avoid a lactacid oxygen debt. If this is so, a test based upon oxygen debt might fail to reveal his true disability. The limitation of exercise tolerance due to angina of effort also falls into a special category.

From this brief survey it is clear that no clinical test of exercise tolerance has yet been developed to the point of practical usefulness. In clinical tests a compromise usually has to be found between reliability and technical simplicity. The latter must, however, be evaluated in the context of current trends, and in view of the increasing refinement, complexity, and costliness of modern methods of diagnosis and treatment it would be unrealistic not to accept a reasonable degree of technical difficulty provided the test were reliable.

The time has come to take stock of the advances in our knowledge of exercise physiology and pathophysiology and to see whether a reliable exercise-tolerance test can be devised. The problems to be faced are, in detail, numerous; but the main lines on which further work might most profitably proceed are fairly clear. Firstly, a good deal remains to be learnt about the precise conditions under which an oxygen debt is contracted and repaid in health and disease. Secondly, a better understanding of the mechanisms whereby the heart-rate increases during exercise would remove much of the empiricism which surrounds existing tests based on heart-rate, and might point the way to a rational and reliable use of cardiotachometry for the assessment of exercise capacity.

Meanwhile, can anything be done to supplement the patient's own account of his disability? The practice of walking upstairs or round the hospital grounds with the patient (or sending the house-physician with him!), besides requiring no apparatus and helping to keep the doctor fit, is often surprisingly informative. It is not uncommon for the patient to score quite heavily in such a competition, and one then has little doubt that his exercise tolerance is reasonably good. The opposite result, in which the patient fares badly, must of course be interpreted with due caution.

SUMMARY

Existing tests of capacity for exercise are reviewed and their merits considered. So far as the clinical assessment of exercise tolerance is concerned there is at present no suitable test of proven reliability. The measurement of oxygen debt after standard exercise appears to be the most promising basis for such a test, but it probably cannot supersede measurements of pulmonary ventilation and heart-rate. While the interpretation and limitations of ventilatory data are now well appreciated, more needs to be learnt about the tachycardia of exercise before tests depending on measurements of heart-rate can be put on a rational basis.

34. Bruce, R. A., Lovejoy, F. W., Yu, P. N. G., McDowall, M. E. *Arch. industr. Hyg.* 1951, **4**, 236.
35. Bruce, R. A., Merendino, K. A., Pampush, J. J., Bergy, G. G., Brock, L. L. *Amer. J. Med.* 1956, **20**, 745.

Medicine and the Law

A Danger on the Roads

A Chester court was told on Aug. 8 that heavy smoking may cause a driver to confuse the colour of traffic signals.[1]

The defendant, who had driven across a road when the traffic lights were against him, and collided with a cyclist, told the police that he believed the signal was green and in his favour. Through his solicitor he said he would not drive again until a specialist—who had diagnosed the condition of " smoker's eye "—said he was cured.

Tobacco amblyopia, as a clinical manifestation of vitamin B_{12} deficiency, was discussed in our issue of Aug. 9.[2]

1. *Daily Herald*, Aug. 9, 1958.
2. Heaton, J. M., McCormick, A. J. A., Freeman, A. G. *Lancet*, Aug. 9, 1958, p. 286.

Special Articles

STARTING A SCHIZOPHRENIC UNIT

ELISABETH SHOENBERG
M.A. Cantab., M.R.C.S., D.P.M.
SENIOR REGISTRAR, ST. BARTHOLOMEW'S HOSPITAL, LONDON, E.C.1, AND GOODMAYES HOSPITAL, ILFORD, ESSEX

ROGER MORGAN
M.B. Lond., D.P.M.
REGISTRAR, GOODMAYES HOSPITAL

IN June, 1957, we opened a schizophrenic unit for men up to about 35 years of age. In it were gathered together 24 long-stay patients who had been scattered through the various chronic wards, together with 6 acutely ill schizophrenics under insulin treatment from the admission ward. Our purpose was to de-institutionalise the long-stay patient, to prevent the acutely ill from becoming " chronics ", and to help both to fit themselves for return to the community wherever possible. For those whose discharge did not ultimately prove practicable we hoped to make life happier and to prevent further withdrawal. Our aims were (1) to reproduce real-life pressures by being no more, and little less, permissive than real life itself; (2) to bring the families into the treatment situation; and (3) to have maximum communication between patients, staff, and relatives.

Social training of the chronic mental patient tends to veer between rigid habit-training and unlimited permissiveness. Since our objective is always reintegration into the outside community, at however humble a level, we have taken pains to avoid both extremes. Rigid habit-training leads to disappointingly little useful conditioning for independent activity, and unlimited permissiveness seems to require greater ego strength than the average schizophrenic possesses. We have tried to be no more permissive than real life itself, but we also give as much opportunity for free choice and decision-taking as is possible. This means that we do not leave the decision about working to the patient, any more than it is left to the ordinary person. For nearly every adult male, going to work regularly is one of the unavoidable pressures of daily life, and this pressure is introduced into our unit to help the schizophrenic prepare himself for leaving the hospital. Leisure, on the other hand, is relatively unorganised in normal life.

In the average chronic ward, the position is the reverse of the real-life situation. Entertainments are often laid on fairly lavishly and can be hard to evade, but work (though encouraged) is optional. In our unit work is the one really compulsory thing. No entertainments are available other than those organised by the patients, and, within very wide limits, the patients run the ward democratically.

We lay great stress on the work always being on a community project of a finite nature, with something completed and concrete as an end-product, so that the patients can take pride in seeing a job completed, and can learn to work together as members of a team. This develops group feeling and makes it possible to involve the very withdrawn in social and productive activity, since even the little they do is done in association with others (who tend to spur them on) and is a positive contribution.

A vital step in returning the schizophrenic to the community is to help his family to accept him and to understand him; this means making a complete assessment of his social background and involving his relatives in the treatment. We therefore have very full communication with the relatives, both individually and collectively, invite them to join in ward activities, and encourage them to have the patients home for weekends and holidays. The families of many chronic schizophrenics often have very severe emotional difficulties and may either reject the patient outright or smother him with ambivalent solicitude, and helping them may have a decisive effect on the patient's recovery.

We have full discussion with the patients at weekly ward meetings as well as individually, so that wherever possible they plan their own lives and understand the purpose and method of treatment. The nurses and doctors meet weekly for full and frank discussion of plans, activities, and problems. The psychologist, psychiatric social workers, and occupational therapists are invited to attend these meetings.

Preliminary Planning

Our first tasks were to select the patients; find a ward for them; staff it; find suitable jobs for the work projects; and get adequate psychological and social information.

We fixed an arbitrary upper age-limit of 35, and all the chronic patients of this age or under were interviewed by one of us. All the departments were visited as possible sources of work, and the problem of finding a finite constructive job on which 20–30 men could work together was discussed with the head occupational therapist, administrators, engineers, gardeners, and indeed everybody we met.

Full social and psychological assessment was planned with the psychiatric social workers and the clinical psychologist.

Finally, the staffing was planned at a meeting of the physician superintendent with all concerned. Despite the shortage it was considered vital to have a full complement of nurses, who should change as little as possible, to ensure continuity. They originally consisted of a charge nurse, two staff nurses, and a student nurse on each of the two shifts. Eventually, however, we had to give up the second staff nurse and have instead a nurse on duty from 7 A.M. to 5 P.M.

The ward selected was in the main hospital; so to go there was an apparently retrograde step for patients comfortably and " permanently " settled in modern " chronic " villas surrounded by pleasant gardens.

24 long-stay patients were chosen, the criterion being a certain minimum capacity for communication, comprehension, and cooperation. The standards were set deliberately low so that hallucinations, delusions, and a considerable degree of withdrawal did not disqualify The habitually disturbed, the incontinent, and the lost were, however, excluded. 16 were voluntary and 8 certified. The average number of admissions was 3·2, and the number of years since first admission varied from 1 to 16, the average being 6·5. 21 patients had had insulin-shock therapy at some time, 18 electroconvulsion therapy, and 4 standard leucotomies. Before transfer to the new unit 14 did some sort of hospital utility work, 5 did regular occupational therapy, and 5 were quite unoccupied.

The insulin unit was transferred from the admission ward to the new ward, with the 6 patients receiving insulin.

Opening the Unit

A few days before the unit was due to open, relatives of the selected chronic patients were invited to a meeting. 47 relatives of 23 (of the basic 24) patients came. At the meeting it was explained that we were opening a new ward for the social rehabilitation of young men. Schizophrenia was not actually mentioned, but its effects in causing deterioration were discussed, as well as the effects of institution life, and a very cautious statement was made of plans and hopes. The relatives were asked for their cooperation, especially over taking the patients home at weekends and at other times.

The meeting was very lively and interested, and people repeatedly said how pleased they were to meet others with the same problems and to discuss mental illness without shame. They were extremely anxious to cooperate with the hospital, asked innumerable questions, and said they would like to meet regularly " to help our boys ". They were pathetically grateful to us for consulting them, and constantly repeated that they wanted to work *with* us. Several offered to invite boys home who had nowhere to go, and there was much discussion (entirely spontaneous) about how they could help in finding work not only for their own relative but for his friends in the unit. It was agreed to meet again in two months.

The day before the ward actually opened, the 24 chronic patients were brought to a meeting, where it was explained to them that they were to be transferred to a new ward.

They showed little interest at first, sitting with bowed shoulders and apathetic rather blank faces. Most stared vaguely at their laps or turned their eyes up to the cornice with moving lips. They did not seem to listen or take much notice of each other, and looked a depressingly shambling stooping deteriorated set of typical long-stay mental hospital patients. The first response came when they were asked to take a good look at each other and say what they had in common. 6 immediately looked up, and very slowly the others gradually raised their heads and looked around in slow motion. Finally somebody said " We're all young ", and several others agreed. From that moment they seemed to listen. It was explained very simply that it was hard on young men to be scattered in wards with elderly men who were not very active, and that we hoped to give them a fuller and more interesting life by concentrating the young men together, and that we wanted to help them regain their confidence and working capacity so as to fit them to leave hospital.

On the whole, the reaction was one of considerable anxiety—partly at having to make any change in their familiar routine, and partly at what the change might really mean. The better patients resented leaving snug, privileged positions and being grouped with the others; the more deteriorated showed a sort of primitive irritability at being poked. They acquiesced in a dreary resigned way to being moved but they did not care for the idea.

The unit started on its activities at a deliberately very slow tempo. We gave them a three-week settling-in period so that the mere fact of being together in a new ward should be all they had to contend with at first. During this time they continued at whatever they had been doing before transfer, working individually in various departments, attending occupational therapy, and so forth. The only change made in their routine was that, from the beginning, they had to make their own beds and join in doing all the ward chores, instead of leaving these to a few ward workers. No ward entertainments of any kind were provided. During this period the patients attended the clinical psychologist for individual assessment.

A weekly ward meeting of patients and staff, with one of the doctors acting as chairman, was initiated. By the second week the patients were growing restive and complained that life was dull and that nothing was done to entertain them. They were then invited to elect a committee of five, and it was at this point that they began to show the first signs of independent action and community feeling. They insisted that all 9 of the candidates nominated should form the committee. They declined our suggestion that a nurse on the committee might be helpful. When asked what they considered the committee's function to be, they surprised us by saying it was to organise work. We fell in with this assumption, and they immediately went into session. They refused to come out for meals, and more than three hours later emerged with a detailed rota for doing all the ward domestic work. This was a far better and wider scheme than anything the staff had envisaged. A striking feature was that it had been planned so that the more deteriorated patients were always put on duty with more capable ones.

During this first period patients kept complaining to nurses and doctors that there were no activities laid on. They were always given the answer that it was up to them to organise whatever they wanted through their committee, and that the staff would be glad to help. In this way, considerable social pressure arose; the pronoun " we " began to be used more often, and an astonishingly wide variety of activities developed.

At the end of three weeks the complete ward routine was introduced, following preliminary discussions with both patients and staff.

All ward domestic work is finished in time for the patients to put on working-clothes and to be out at work by 10 A.M. They knock off in time to get back to the ward and wash, ready for lunch at 1 P.M. In the afternoons there are various communal pursuits—e.g., play-reading, swimming, physical training, football, and cricket. Selected patients meet for group therapy once or twice a week. Thursday is a free afternoon. In the early evenings there are occupational-therapy hobby classes twice a week, and in the evenings a great variety of social events. Patients are encouraged to go out as much as possible and to go home at weekends. The insulin patients have their treatment during the morning but are drawn into general ward activities during the rest of the day. The staff meet weekly to discuss ward affairs, blow off steam, and settle policy. Frank criticism is encouraged, and this has done much to ensure smooth working together.

Work and Leisure

Our first project was to make a drive and gardens for the new occupational-therapy department.

The ground was extremely rough and full of iron and concrete posts, a concrete sunken shelter, a jungle of weeds, builders' debris, and a sort of artificial mountain resulting from the builders' excavations. The men worked hard and consistently, asked to see the architect's plans, and frequently discussed the job at ward meetings, making all sort of criticisms and suggestions. Even the most apathetic and withdrawn gradually began to do a little, though they needed a lot of encouragement. The nurses voluntarily worked with them, putting on denims and heavy boots, which is not the tradition in this hospital, and tactfully drawing into activity the apathetic preoccupied patients who tended to lean on a spade, listening to hallucinatory voices.

Our second project was the construction of a hospital car-park. We also undertook the destruction of some air-raid shelters, and the uprooting of a lot of fences no longer needed in a hospital with unlocked wards. The third project was a hospital road-widening scheme.

The response to all this hard navvying work was unexpectedly enthusiastic; the men seem to like purposeful physical activity and to enjoy both the destructive and constructive aspects of the work. They take a keen interest in the project as a whole and discuss it very critically. We have tried to foster this critical attitude by showing them the working drawings and by talking over the various difficulties as fully as possible at ward meetings. They take great pride in the finished job and are often to be seen showing their visitors what has been accomplished.

It was very interesting to see their reaction to being put on non-project work for a few days. Between projects the patients were asked to lend a hand, as individuals, in routine gardening. This work is productive and useful, but they all grumbled and obviously felt bored and dis-

couraged. Several explained that they wanted a job of their own, where they could work together and see what they had accomplished. Patients are paid 5*s*. 6*d*. a week for their work (the rate in this hospital for ward and garden workers). There are occasional grumbles, and many jokes about chain gangs and the Burma Road, but most seem to realise that work is primarily treatment and only secondarily money-making. Patients on insulin treatment are paid 2*s*. a week.

The patients take their duties of self-government very seriously and have made life so busy for themselves that sometimes they have difficulty in sparing time to be interviewed by their doctor. At the weekly ward meeting the ward secretary reads the minutes; the treasurer gives his report; and the doings of the week are discussed and new plans considered. When new activities are suggested, as they constantly are, there is usually quite lively discussion, and sometimes a vote is taken. If something new is decided on, a patient usually volunteers to make arrangements and reports back the next week.

The ward meetings follow a fairly set pattern. We try to promote discussion and argument, while saying as little as possible ourselves. We react less strongly to the occasional deluded ramblings than do the patients themselves, who become very restless and practically eliminate any contribution that is not strictly to the point. We wait quietly through periods of silence but are not slow to close a meeting after 30–45 minutes when it is clear that nobody has anything more to say.

Making money for the ward funds is a constant preoccupation. Within two months the fund was up to £14. Money has been made by a tea-club which sells extra refreshments; raffles; a white-elephant stall at parties; and selling things made at the occupational-therapy hobby class. The money is spent on theatres, football matches, and so forth, and there are also share-outs when patients go on leave at the end of a project.

A parallel unit for schizophrenic women was opened about a month after the male one, and there is a great deal of joint activity. This free mixing of the two wards grew up spontaneously. The first move was made by the men, who wanted dancing-lessons, and on their own initiative invited the girls over for the first lesson. This grew into a weekly informal dance. Next the men invaded the women's cookery classes; the women came over to join the play readings (which are very dramatic affairs run by a professional coach), and soon the two wards had formed a habit of mixing socially on most days. This was unpopular with quite a number of the men, who felt shy and nervous with women, but they have gradually come to tolerate their visitors and have even made friends.

There are all the normal activities and games (table tennis, snooker, billiards, darts, football, cricket, and baseball), with whist drives, regular visits to the local swimming-baths, hobby classes, and cookery lessons (by the hospital catering officer). There are two or three socials a week, and our patients take a prominent part in hospital social life as a whole. They are the most active members of the hospital social club and organised the hospital Guy Fawkes party: they built the bonfire, set off the fireworks, and fed the company on roast potatoes. There are also a skiffle group and a fortnightly ward newspaper. In the summer the patients arrange a weekly outing, for which they are allowed to use the hospital coach, and it is left entirely to them to plan the outing and to finance it if necessary. Most of the outings have been to Southend and other local places during the summer, but the patients have also been to Kew Gardens, Hampton Court, a circus, the Zoo, the Science Museum, and Wembley (to watch England *v*. France), and have on several occasions made block bookings at theatres. One play chosen was *Look Back in Anger*.

Regular end-of-project parties are held. These are organised entirely by the patients, who send out formal invitations to their relatives and friends. The first of these ward parties, about five weeks after the ward opened, arose out of the promise at the first relatives' meeting to meet again in two months' time. The party was a remarkable success, gave an excellent opportunity for staff and relatives to meet and talk, and showed the patients in a new light to their relatives, most of them acting very competently as hosts. Further parties were clearly indicated, and it occurred to us to hold them at the end of each work project, with a week's leave after each.

The projects are planned to last about three months. Their completion is accompanied by a general feeling of pride and satisfaction, and it is fitting to mark this by a kind of end-of-term celebration. The leave period is useful in several ways. Mild pressure can be brought to bear on relatives who seem unreasonably reluctant to have patients home. It is a convenient landmark at which to discharge the occasional patient; this is mainly useful with short-stay patients and can be a lever to dislodge some or to hold others for those few weeks longer which may be desirable. Above all it breaks up the dreary interminable succession of months which in an institution follow one another without interlude or highlight. We hope it may have some effect in restoring a form of rhythm to patients' lives and possibly combat the time distortion of the chronic schizophrenic. Usually more than half the ward go on leave at this time, thus giving the staff a brief opportunity to concentrate on the more deteriorated patients who are left: these enjoy a week in which they get all the attention.

When insulin patients first join the unit, the long-stay patients are extraordinarily tolerant of the extravagances of the acutely ill, draw them into ward activities, watch over them for signs of secondary coma, and give them constant encouragement. As the insulin patients improve, they in their turn contribute to the community. They take a leading part in organising activities and bring their outside interests into what might otherwise be a too self contained little group. Insulin treatment is followed and accompanied by social training, and valuable continuity is achieved with none of the trauma that so often accompanies a patient's transfer from the insulin unit to a convalescent ward.

Putting the insulin unit into this open ward, which lacks the staff necessary for 24-hour continuous observation of patients in bed, gives rise to certain difficulties. Some acutely disturbed recent admissions have been too unreliable for such a ward and have had to be treated elsewhere until electroconvulsive therapy, chlorpromazine, or the healing power of Nature has made them socially suitable for insulin-shock therapy. Others, who continued too disturbed for the ward, have had to be denied insulin-shock therapy even when it was considered the treatment of election.

New entrants to the unit, whether for insulin or for social therapy alone, have come through other wards. They are always vetted by one of us, and there is no direct admission.

The influence of other patients in social therapy is proving very valuable.

A good example of this is the Junior Supper Club. About 12 of the better preserved patients meet informally in the kitchen most nights for a little supper which they buy and cook for themselves on a communal basis. This has been nicknamed the Senior Supper Club. One member organised what he calls the Junior Supper Club. For this he gathered together the 8 or 9 most deteriorated patients—the withdrawn apathetic ones who join in very little and would certainly not agree to

pool their money for supper. He draws them together each evening, makes them toast and hot milk, and often provides more at his own expense. After months of persistent effort the Junior Supper Club now assembles fairly spontaneously, and some of its members now help to make the toast, wash up, and begin to show a very little social feeling.

Staff and Patients

The great stress laid on maximum communication between patients, nurses, relatives, and doctors makes it possible to foster and recognise—as well as tolerate—the first stirrings of initiative. Great skill and patience are needed on the part of the nurses to guide the reviving patient into socially acceptable modes of expression. This means that the ward offers an exceptionally good training-ground for the student nurses who come to us for up to three months at a time. Their curiosity and receptivity are very valuable to the unit, and we ask them to make a careful study of particular patients. They then present their observations to the ward staff meeting, and in this way patients are reassessed, and plans for treatment are made by the meeting as a whole. This means that the long-stay patients with great folders full of forgotten notes are considered again as though they were new problems, and this often produces a new approach which is helpful to the patient.

Of the 24 founder members, 5 have had to be transferred to other wards; 2 because they ran away repeatedly, 1 became intolerably aggressive, 1 impulsive, and 1 negativistic enough to be a bad influence. 2 others did not return from leave and had to be left at home with our blessing if not our approval.

There is a steady flow of discharges of short-stay patients, and the first 3 long-stay patients have now started work at a nearby factory, while continuing to live in the unit for the time being. A 4th (the organiser of the Junior Supper Club) has just joined an Anglican monastery as a resident lay worker.

This partial withdrawal of 4 of the best-preserved and most active long-stay patients has stimulated initiative in some of those who were content to be organised by them. New leaders, though of rather inferior calibre, have begun to appear and take their work as committee members very seriously. 3 or 4 patients show no improvement, do not cooperate, and try to avoid their share of communal chores. They are much resented by the others and are often publicly criticised, but so far the community continues to tolerate them.

Discussion

Living in a self-governing community and working as a group on socially useful projects has had a marked effect on the patients, which is commented on spontaneously by all who know them, especially their relatives. " Even the goldfish are more active in this ward " is our most precious testimonial. The patients themselves say that life is much more enjoyable now, and many comment on feeling fitter and more confident. They look smarter and brisker, talk more spontaneously, and are altogether more responsive. With a high proportion of those who have been severely damaged by their illness, this may well be all that can be achieved. We hope, however, to return the others to the community.

It is difficult to quantify the improvements observed or to assign cause and effect accurately; but there seems to be little doubt that we have established not only a happy ward but also one with therapeutic powers. These therapeutic powers seem to depend to a very considerable extent on having the same nurses on the unit long enough to establish a real relationship, and on having enough of them. Sometimes, when the hospital has been short of staff, we have had frequent changes, with nurses coming for short periods as reliefs. These times have been marked by a sagging ward morale with a tendency to return to aimless drifting, and a failure to cultivate the patients' initiative. A nurse doing this kind of work needs the same sort of patience as a mother who lets her 3-year-old do up his own buttons.

Many of the chronic patients who have improved so much in bearing, work, and apparent social adjustment, retain intact their delusions and disordered modes of thought. The King of the Incas, while retaining his imperial status, now works quite well, joins in the discussion, and looks neat and relatively brisk, compared with his former slouching idleness only relieved by occasionally toying with a little basket-work. This suggests that much of the typical " chronic patient " appearance and behaviour is due to hospital conditioning, and is not necessarily an inescapable consequence of the primary illness. The long-stay mental-hospital patient is all too likely to lose his human dignity through giving up his own responsibility for himself, and in our unit we are trying to prevent this happening.

Summary

Our experience in starting a new schizophrenic unit on community lines is described. We have tried to improve certain aspects of the care of long-stay patients in a hospital where (if we may say this, being only short-stay doctors) the standard of such care is already high. The essential principles involved are (1) an attempt to reproduce normal stresses by introducing compulsory work and democratic social organisation, (2) bringing the families into the treatment situation, (3) maximum communication, (4) selective mixing of acute and chronic cases for mutual benefit.

The preliminary planning and the mechanism of opening the ward are described, followed by a general account of how things have worked out during the first year.

We are indebted to Dr. G. Somerville, physician superintendent, and Dr. J. E. McA. Glancy, consultant psychiatrist, for their help and encouragement as well as to Miss J. Stapleton, clinical psychologist, Miss Abley and Miss S. MacNulty, psychiatric social workers, and Miss M. D. Beldam, head occupational therapist, for their valuable assistance.

THE HEALTH SERVICE IN 1957

LAST year, perhaps the most important event bearing on the National Health Service was the publication of the report of the Royal Commission on the Law relating to Mental Illness and Mental Deficiency.[1] One of the Commission's recommendations—that mentally defective patients should be compulsorily detained in hospital only when this is positively necessary for the patient's own welfare or for the protection of others—has already been acted on.[2] In his introduction to the Ministry of Health's report on the year,[3] Mr. Derek Walker-Smith, the Minister, says that he looks forward to new legislation " as soon as the difficulties and complexities of the subject permit ".

DEMANDS ON HOSPITALS

The annual report shows the year to have been one of solid endeavour. The hospitals of England and Wales treated some 55,000 more inpatients than in the previous

1. Report of the Royal Commission on the Law Relating to Mental Illness and Mental Deficiency. H.M. Stationery Office, 1957. See *Lancet*, 1957, i, 1187.
2. Circular H.M.(58)5.
3. Report of the Ministry of Health for the year ended Dec. 31, 1957. Part 1. 1: The National Health Service. 2: Welfare, Food and Drugs, Civil Defence. Cmd. 495. H.M. Stationery Office. 1958. Pp. 254. 12*s*.

year, the total being 3,794,000; but waiting-lists, which had been falling in previous years, increased by about 9000 to 440,000.

Last year some 29% more patients were treated than in 1949, though the number of beds was only about 6% greater than at the start of the service.

At the end of the year patients awaiting admission to general-surgery departments numbered 131,000, and those awaiting admission to ear, nose, and throat departments numbered 104,000; these two departments thus accounted for more than half of the total waiting-lists. The extent of waiting-lists differed greatly between England and Wales and between regions in England. In Wales, only in traumatic and orthopædic surgery and in " other " departments were there increased waiting-lists. In England, the demand for admissions to hospitals in the Oxford region continued to increase; in contrast, the overall position improved somewhat in the Manchester and Liverpool regions, and waiting-lists increased less than average in East Anglia.

In general, both the London and provincial teaching hospitals have much larger waiting-lists in relation to their resources of staffed beds than the non-teaching hospitals.

Compared with the non-teaching hospitals, about three times as many patients were awaiting admission to the general medical departments of London teaching hospitals, and three and a half times as many to the same departments of the provincial teaching hospitals. For general-surgery departments the difference between the London teaching and non-teaching hospitals was not so great; but at the provincial teaching hospitals the waiting-lists per 100 staffed beds were about two-fifths greater than at the non-teaching hospitals.

At the non-teaching hospitals most major departments except ear, nose, and throat, and at the teaching hospitals most departments except ear, nose, and throat and gynæcology, treated more patients per available bed than in 1956. This was due in nearly every instance to reduced stay in hospital, and not to reduced interval between occupation of beds.

The number of inpatients admitted to designated mental hospitals was 88,943, of whom 73,499 (82·6%) were voluntary patients, 1318 (1·5%) temporary, and 14,126 (15·9%) certified. The total in 1956 was 83,994, of whom 65,637 (78·2%) were voluntary, 1453 (1·7%) temporary, and 16,904 (20·1%) certified.

The number of patients admitted to mental hospitals has been rising steadily for many years—the number increased by some 5000 in 1957—but the number of patients resident has begun to fall, owing to the rehabilitation and discharge of patients who have been in hospital for many years, and the shorter stay of newly admitted patients. In 1957 the national average of overcrowding, which had been 14% in 1956, fell to 11·9%.

HEARING-AIDS

During the year 52,166 new patients were fitted with hearing-aids, bringing the total fitted with aids since 1948 to over 580,000. Following field trials orders were placed for the first batch of 'Medresco' transistor hearing-aids. These aids, which weigh just under 3 oz. complete with battery, compared with 24½ oz. with battery case for the original model issued in 1948, are intended in the first instance for children and will not be available to adults until 1959.

BLOOD-TRANSFUSION

The strength of the civilian donor panel in the National Blood Transfusion Service amounted to 674,117 at the end of the year, compared with 639,319 a year earlier. The number of donations rose from 803,522 in 1956 to 846,202 in 1957. The attendance-rate of general-public donors invited to give blood remained unchanged at an average of 51·8%.

CONSULTANTS

Consultants in the National Health Service, including those employed by the Board of Control and in the Public Health Laboratory Service, numbered 6902 at the end of last year, compared with 6739 at the end of 1956 and 5649 at the end of 1950. The numbers receiving distinction awards were as follows: A (£2500 per annum), 276; B (£1500), 690; C (£500), 1377.

GENERAL MEDICAL SERVICES

During the year the number of doctors admitted to executive councils' lists was 936 and the number deleted was 694. Of those admitted, 601 entered into partnership, including 310 assistants who joined their former principals. The total number of doctors practising as principals and providing unrestricted general medical services in England and Wales at July 1 increased from 19,082 in 1956 to 19,343 in 1957. The number of single-handed practitioners (including those with assistants) continued to decline—from 6568 in 1956 to 6381 in 1957. The number of assistants (excluding trainee general practitioners) at July 1, 1957, was 1465, compared with 1546 in 1956. The general decrease in assistants which seemed to have been arrested in 1955 and 1956 has now been resumed.

There was a further decrease in the number of patients living in under-doctored areas from 9,500,000 in 1956 to 8,500,000 in 1957. The average number of patients per doctor remained virtually the same—2273, compared with 2272 in 1956.

GENERAL DENTAL SERVICES

From 1952 onwards the volume of treatment given under the general dental services increased at the rate of 8–9% a year, but in 1957 the increase over the previous year was only 5·2%. This was nevertheless appreciably more than the increase in the number of dentists in the service (2·3%). At the end of the year 16,113 dentists were on the Dentists Register, compared with 16,007 at the end of 1956.

EFFECTS OF RADIATION

M.R.C. Committee's Comments on U.N. Report

THE committee appointed by the Medical Research Council to report on the hazards to man of nuclear and allied radiations has prepared a statement [1] on the United Nations report published last week.[2]

In general the U.N. report follows the same lines as the reports of the M.R.C. committee and the United States National Academy of Sciences, both of which were published in 1956. " We have derived considerable reassurance ", the M.R.C. committee say, " from the fact that, in a field of science that is so difficult and, as yet, relatively little developed, the three major reports on this subject are so substantially in agreement with each other ". In the past two years much additional information has been collected, but it has led to no major revisions of opinion: " rather it has strengthened and amplified the tentative conclusions and predictions in the two earlier reports ". Both the 1956 reports confined their attention to conditions in technologically well-developed

1. Statement on the Report of the United Nations Scientific Committee on the Effects of Atomic Radiation. H.M. Stationery Office. Cmd. 508. Pp. 15. 1s.

2. See *Lancet*, Aug. 16, 1958, p. 360.

countries of the Western world: the U.N. committee has considered the problem on a worldwide basis.

DOSE AND EFFECT

From their reading of the U.N. report, the M.R.C. committee derived the impression of a predisposition to favour the view that induction by radiation of such possible long-term somatic effects as leukæmia and cancer was a process comparable to that of induction by radiation of genetic mutations, and that there was, in consequence, no threshold dose below which there was no induction of such somatic effects. "In our opinion, this view tends to tinge the interpretation of subsequent data, despite the earlier recognition of the equally tenable alternative view". The M.R.C. committee add:

"In our view, it is not possible at this present time to decide whether there is or is not a threshold dose concerned in the induction of leukæmia and cancer, and the only scientific attitude to the problem at present is one of suspended judgment. Nevertheless the significance of the alternative points of view in determining the ultimate assessment of risk should be clearly understood so that those who have the responsibility for acting on such assessments should be fully aware of the alternative possibilities that need to be taken into account."

GENETIC EFFECTS

The M.R.C. committee accept the view that the knowledge now available indicates that "there is at present no known threshold of radiation exposure below which genetic damage does not occur", that "the experimental foundation for a linear dose relationship is fairly well established at moderate doses but is increasingly meagre at lower doses", and "that it is prudent to assume . . . as much hazard as is implied by a linear relation between mutation and gonad dose".

In the difficult matter of estimating the amount of radiation required to double the mutation-rate of a representative number of human genes the U.N. committee arrived at a range of possible values similar to that put forward in the M.R.C. report. They suggest a range of 10–100 rad, compared with the M.R.C.'s figure of 30–80 rad.

DIAGNOSTIC IRRADIATION

Both the 1956 reports drew attention to the large contribution made by medical diagnostic irradiation to the genetically significant population dose. The M.R.C. committee had put this contribution at some 22% of the natural background, with the reservation that this figure should be regarded as tentative and probably a lower limit. They now say that "further information has confirmed us in this reservation so that we are now willing to accept that the genetically significant dose from this source may be as much as 100 per cent. of the natural background radiation in countries with extensive medical facilities". It is reassuring to note, they add, that there is agreement that most of this genetically significant dose comes from a few types of radiological examinations.

FISSION PRODUCTS

Since 1956, it has become recognised that the deposition of fission products from the reservoir in the stratosphere is not uniform over the globe, but that countries between 30° and 50° N may receive a deposition about three times greater than the worldwide average. In this country the annual fallout-rate of ^{90}Sr has increased very little since 1954—from 2 to 2·5 microcuries per sq. km. In New York State the increase has been from 3 to about 4·5 microcuries per sq. km.

The U.N. committee concluded that, for the same degree of fallout, the average concentration of ^{90}Sr in the bones of those living on a plant-type diet may be up to 5 or 6 times that in the bones of those on a milk-type diet. The M.R.C. committee consider that, on the available evidence, this is a reasonable conclusion; and they think that the methods chosen for calculating future fallout levels are also reasonable, "but the soundness of the conclusions reached necessarily depends on the validity of the initial assumptions".

ASSESSMENT OF THE HAZARDS

In 1956 the M.R.C. committee said that the maximum allowable concentration of ^{90}Sr in the bones of the general population, with its proportion of young children, should not be greater than 100 strontium units (S.U.). The special subcommittee of the United States National Academy of Sciences appointed to consider this matter were unable to reach agreement, but the general belief was that 50 S.U. would produce no perceptible effect. The M.R.C. report said that immediate consideration would be required if the level in the general population showed signs of rising greatly above 10 S.U. The mean marrow fallout doses over 70 years given in the U.N. report are equivalent to strontium levels ranging from 2·3 S.U. as the average in bones of people on a milk-type diet (assuming weapon tests stop at the end of 1958) to 240 S.U. in bones of those on a plant-type diet (assuming weapon tests continue under certain hypothetical circumstances until equilibrium is reached in about 100 years). The significance to be put on these figures depends on the existence or absence of a threshold, and "in the present state of knowledge it is not possible to decide between these alternatives".

HOSPITAL ADMINISTRATIVE AND CLERICAL STAFF

AT the end of last year, in a report to the Ministry of Health and the Department of Health for Scotland, Sir Noel Hall recommended revision of the grading structure of the administrative and clerical staff of hospitals.[1] The Ministers referred his proposals to the appropriate Whitley Council. The management and staff sides accepted Sir Noel's proposal that the seven existing lettered grades A–G should be replaced by the following five new grades: clerical, higher clerical, junior administrative (which is to be a training grade), general administrative, and senior administrative.

The salary scales of the present grades are:

A1	£206–£453	D	£556–£659
A2	£206–£515	E	£623–£753
B	£299–£546	F	£693–£862
C	£515–£597	G	£802–£983

The scales for the proposed new grades, which have been accepted by both sides of the Whitley Council, are:

Clerical grade	£230–£600
Higher clerical grade	£575–£735
Junior administrative grade	£575–£725
General administrative grade	£750–£1000
Senior administrative grade	£1000–£1240

The management and staffs sides were, however, unable to agree on the manner and pace of introducing these changes, and the disagreement was referred to the Industrial Court. By their recent award [2] all staff are to remain at their present rate of pay until each employing authority has reviewed certain posts according to the new grading structure; this review is to be completed before Nov. 1.

1. *Lancet*, 1957, ii, 1104.
2. Industrial Court (2701) National Health Service.

Salaries will be raised to the new rates in stages. The first increase will be retrospective to July 1, 1958, and the new rates must be completely introduced by July 1, 1959, for the clerical grades; by July 1, 1960, for the general administrative grade; and by July 1, 1961, for the senior administrative grade. Immediate increases will vary from £22 to about £100 a year.

Negotiations on "designated" posts, including hospital secretaries, are continuing. The award affects only hospital officers and does not apply to other National Health Services clerical and administrative officers such as those serving executive councils.

Public Health

Cholera in Asia

Cholera has broken out in Khatmandu, Nepal. This is the first cholera epidemic reported in that country since the beginning of the century.

The cholera situation in Asia, according to W.H.O., is the most serious in years. Cases and deaths are twice as numerous as last year in India and East Pakistan, and an epidemic has struck Thailand for the first time for many years. Cholera has also been recorded in Cambodia and Burma. Cumulative totals up to July 31 were as follows:

	Cases	*Deaths*
India	29,372	12,851
East Pakistan	10,386	6644
Thailand	8964	1190
Cambodia	3	0
Burma	4	2
	48,729	20,687

THE Indian Minister of Health said last week [1] that more than 16,000 people had died of cholera and smallpox in Bihar and West Bengal in the first six months of this year. Smallpox was also epidemic in Uttar Pradesh but figures were not yet complete. Unofficial estimates put cholera deaths in the Katmandu Valley of Nepal at more than 300.

No Fluoridation in Worcestershire

THE public health committee of Redditch accepted the medical officer of health's recommendation to put fluorine in the town's water-supply, and similar decisions were reached by the two Bromsgrove councils, who also receive water from the East Worcestershire Waterworks Company. But the company has rejected their requests because it is uncertain about the legal situation. The manager is reported [2] to have said that his board had decided to take no action until the results of the Ministry of Health's experiments in three other test areas (Watford, Kilmarnock, and Anglesey) were announced. "I doubt whether there is a single undertaking in the country that would take any notice of such appeals until the Ministry report is issued," he added. The decisions at Redditch and Bromsgrove had not been met by any such organised protest as led Andover Borough Council to stop the testing of fluoridation.[3]

Mustard Gas Burns?

ON Aug. 4 two young men were walking with a dog on the Western Heights, Dover.[4] The dog apparently burned its mouth while in some long grass, and later it had to be destroyed. Next day a rash appeared on the arms of the two youths. They went to hospital, but were not detained. The possibility that they came in contact with mustard gas is being investigated, but this explanation is now thought unlikely.

1. *Times*, Aug. 18.
2. *Ibid.* Aug. 16.
3. *Lancet*, July 26, 1958, p. 204.
4. *Times*, Aug. 15.

In England Now

A Running Commentary by Peripatetic Correspondents

The second brood of swallows are well on the wing. There has not been time for a third this year. I am no ornithologist; the swallows have always been just part of our pattern of life, and have shared this house with the dalesmen who watched before us for the past four hundred years. I do not understand why they should choose to come back or how they do it: there are some things over which one should rest content. About the beginning of April, when the first lambs are being born around us in the valley, we start to look down the long silver ribbon of Windermere for the silhouettes of wavering flight out of the warming sun. The winters are long in Lakeland, grim and austere on the fells. The swallows mean more to us than birds returning. It was April 21 when they came this year: the Queen's birthday, the day the children came back from abroad, the day the sun was shining. Back to the same set of nests in the stable, the twittering around the chimney pots, the curving flight to the beck for mud to mend the lip of the nest, the pantomime of courting, and then down to serious business on a clutch of eggs.

For as long as I can remember the stable has held just one pair of swallows: they surely cannot be the same pair year after year. How do they decide which ones shall inherit the nest next season? Eight or a dozen youngsters fly away in autumn: two birds come back in spring. No fighting for possession, no queuing up, no ribbon development along the stable beam. Somewhere and somehow these things must be decided: perhaps around the pillars of the Parthenon on Christmas Day, perhaps along the timelessness of the Nile. Two birds come back in spring. There are days when I should like to know the answers. Where the rest of them have gone? How many seasons one pair are here? Ring them with metal bands? But my heart would rather not know. For who were all the people laughing through this house for its four centuries on the fellside, watching the swallows: where did all their children go, and how was it handed down? They are gentle ghosts who deserve their rest. Who will care in 2358 for the brief season of our day? They will watch the swallows still. The second brood are well on the wing: I know now when they will go. It will be the third week in September: the week when eighteen years ago the sky was weaving with the swooping tumbling flight of youngsters: to decide who should come back to England in the spring.

* * *

I came into our hospital the back way the other morning (my usual short-cut between the departments of psychiatry and radiotherapy) and saw, standing between these two buildings, the back half of a red double-decker bus. Nobody knew how it had got there, or who put it there, or why, and speculation ran wild.

Perhaps it was something to do with the bus strike—the busmen cutting off half their bus to spite the other half; or was it a rather embarrassing gift from one of the inhabitants of the nearby Fen villages who had run amok with a large saw, and was distributing half buses here and there to his friends and acquaintances?

We thought it might be connected with radiotherapy, as it stood between their main building and the shed which houses their precious noisy and extremely temperamental synkrotron. Was it, perhaps, a new synkrotron, heavily disguised, one that did not need a lead wall around it, 6 ft. thick, or the ministrations of two full-time highly qualified physicists and their minions to coax a few hours' work out of it weekly? But the radiotherapy director disclaimed it.

The most likely explanation seemed to be that it was some sort of psychotherapeutic aid—a solid symbol on which the patients and psychiatrists could hang their fantasies. The castrated appearance of the bus was thought to support this view. But the psychiatrists were as mystified as the rest of us.

The explanation turned out to be straightforward and slightly disappointing. The half bus was a present from the local coach company to the department of physical medicine to help in the rehabilitation of their patients, and its final home is outside

physiotherapy, where it looks both useful and decorative, with a red rose in a tooth-mug at the foot of its stairs.

* * *

The Neo-medical Travel Agency has been closed. I really cannot understand why. To say the least it is unfortunate for we had a very satisfied, well-informed clientele.

We used to take our clients as far as mid-Channel before putting them under (with hypnotism I mean), but we soon realised that we could cut expense by not transporting them at all, so they just used to come to the agency. We bundled them upstairs, luggage and all, laid them down, and put them under; and there they lay for their time—two or three weeks, whatever their holiday period was. We tube-fed them, nursed them carefully, gave them twelve hours' sleep and twelve hours of movies (full-colour local views including the hotel). We played them tapes with all the relevant local vital statistics, which made them the most knowledgeable travellers of an agency; and they all turned out nut-brown with judicious dosing with ultraviolet rays (no painful burns or peeling).

It was a pleasure to watch them at the end of their time going forth, their minds full of the pleasures of France, Spain, Greece, or wherever they thought they had been, well fed, well tanned, and well rested. Quite a contrast to the peeling, harassed, confused traveller of other agencies who needs a fortnight's rest to recuperate from his holiday.

Just because we couldn't get one under, all the rest have to suffer. We tried to explain to him, but he wouldn't be reasonable. He reported us to the authorities and they closed us. It is all most disappointing, and I really cannot understand their attitude. I was going to say "it's a strange world," but some of us have now come to feel that there really isn't anything farther than mid-Channel.

* * *

Once again my hayfever season has ended and the year's "most effective ever" drug has been assessed. It did not seem to make a great deal of difference to my streaming nose and eyes, but at least it did not send me to sleep. (The fairly early end of my surgical career may well have been influenced by the fact that on one bright July day, when well dosed with the latest antihistamine drug, I began to snore in the operating-theatre.) In early summer people ask my advice about treatment. They wait patiently while I try to find one of my five handkerchiefs, then sigh resignedly and go away. One day last month I was sneezing happily away in the train, when I had a disturbing thought. "You just look ridiculous, my friend". Observe the method; no thought of treatment, no concern, and certainly no sympathy. Within minutes the attack had ended and since then I have found the result can be repeated. Perhaps this new approach is a good one, or perhaps the latest wonder drug deserves more credit than I have given it.

* * *

An octogenarian Yorkshire lady stopped me in the street one day. "Hey doctor! My granddaughter's got spots on 'er face. You know the name. The one like 'orses and carriages. What d'yer call it? Oh, yes, acne." Or does she spell it 'ackney?

* * *

Problems of irradiation
Are disturbing every nation
Bent on human preservation.
Genetic hazards must be measured
If fertility is treasured.

People potter round with counters
That they cannot understand,
Write alarmingly to papers
About death upon the land.
They know nothing of the meaning of the röntgen and the rem,
The rep and rad are so much Greek to them.
And when faced with R.B.E.
They are hopelessly at sea.

But mutation of the gene
Doesn't worry Aberdeen.
It will populate the planet
In despite of rays from granite.

Letters to the Editor

CHILDREN IN HOSPITAL

SIR,—The provision of a satisfactory hospital service for children concerns us all. The report set out by the Royal College of Physicians (April, 1957) to guide "individuals and authorities who are planning the care of children in hospital" has been sadly overlooked. It stated that "there is no doubt that special children's hospitals offer the best service for children because the staff at all levels and in all departments is attuned to the special needs of the sick child". Pædiatric physicians and surgeons must be grateful to Professor Illingworth and to *The Lancet* for its leading article (July 26) for re-emphasising these needs to the medical world, and to Mr. Denis Browne and Dr. Helen Mackay for bringing the facts before the public through correspondence in *The Times* (Aug. 6 and 11). The threatened closure of children's hospitals strikes horror in the hearts of those who can best understand the special needs of ill children.

For a long time cold war has existed between children's hospitals and fever hospitals, but, now that Dr. Emond (Aug. 9) tells us that fever units admit, and should admit, cases of pneumonia and meningitis, he shows how false is the separation of patients into these two special hospitals. Pædiatric units admit these cases too, and a children's hospital with suitable isolation facilities for "infectious diseases and notifiable infectious diseases" could provide a comprehensive hospital service for children in which specialists in all branches of pædiatric medicine could cooperate. The Ministry of Health stated [1] that "it is of the utmost importance that hospitals and wards for infectious diseases should be closely associated with pædiatric departments" and the Royal College of Physicians report endorses this view and urges that pædiatricians be appointed to fever hospitals when vacancies arise and that blocks for infectious fever should be included in the development of large pædiatric units. This will not come to pass if the Minister pursues his policy of closing children's hospitals. URSULA JAMES.

SIR,—I am delighted to know, from Mr. Braithwaite (Aug. 16), that the South West Metropolitan Regional Board no longer intend the immediate closure of Queen Mary's. But this is news. On July 23 the chairman of the regional board, Mr. A. G. Linfield, told the chairman of our management committee, Major H. J. Wells, that it was the intention to "run Queen Mary's down" over the next few months and that the Fountain Hospital would move in early in 1959. The chairman of the Surrey and West Sussex area committee of the board, Major-General L. A. Hawes, was present at this interview, but Mr. Braithwaite was not. If any charge of inaccuracy is to be made, therefore, it should not be directed at me.

Mr. Braithwaite's second charge contains a half-truth. The chairman did refuse, as I reported in my letter of Aug. 2 to entertain the idea of getting expert pædiatric advice. It was *after* this that the board had second thoughts, and invited Professor Moncrieff. I entirely concur with the views in Mr. Braithwaite's last paragraph, but the inaccurate and intemperate statements have not been mine. Personal attacks will not deflect me, or I hope others, from sober and careful study of this important issue in all its aspects.

Queen Mary's Hospital for Children, Carshalton, Surrey. DAVID LAWSON. Physician-Superintendent.

1. R.H.B. 48 1.

UNSATURATED FATS AND IMPORT RESTRICTIONS

SIR,—Recent work has established a high probability that human arterial disease is influenced by dietary fats, and has proved that the replacement of saturated fats by polyethenoid oils tends to reduce the cholesterol content of human serum.[1 2] Since a dietary change of this type is almost certainly harmless, and safer than any excessive restriction of fats, it seems desirable to advise patients with raised blood-pressure or anginal pain to make this change as far as is reasonably practicable. Thus butter and cooking-fats may be replaced by corn oil (from maize), or by the more expensive sunflower or safflower oils, and the saturated fats may be further reduced by substituting skim-milk powder and skim-milk cheese for the normal products.

I find, however, that patients in Britain are unable to purchase corn oil, and have difficulty in finding other flavourless oils with a high content of polyethenoid acids. On inquiry from a leading London store I am informed that, owing to Board of Trade decisions on goods requiring dollars, " corn oil does not at present figure in goods to be bought from abroad ".

It would, I suggest, be helpful to the numerous British people suffering from arterial disease (and possibly those from certain other serious diseases, as suggested by Sinclair [3]) if some correspondent would mention in your columns such edible " unsaturated " oils as can be bought retail in Britain, and their average content of linoleic or other polyethenoid acids. If no refined oils are available, except olive oil which is useless for this purpose, and West African groundnut oil which is described by Hilditch as low in content of linoleic acid,[4] could the medical advisers to the Board of Trade consider allowing the import of corn oil from Canada or the U.S.A.? It seems at least possible that this would reduce the rate of ageing of some of the most active people in the nation.

Ganges,
British Columbia,
Canada. R. B. BOURDILLON.

MODIFICATION OF EGG-YOLK FATS

SIR,—The forcing of domestic poultry to consume sunflower seeds instead of those grains which are natural to them, in order that human beings may themselves consume an unnatural product in the form of their eggs so altered, breaks every evolutionary law and can therefore never hold the solution to the problem of coronary disease.

I have tried to point out in a small publication [5] that the Darwinian theory of evolution teaches us that we should consume those fats that we individually like, whether animal or otherwise, in just the amounts we desire, always assuming that the fats have not been greatly altered from their natural state or so mixed with other foods that we are unaware we are eating them.

Securing an unnatural product by the means described in your issue of Aug. 2 (p. 243) is therefore doomed to failure from the start. How can the tactics be correct when the overall strategy can be proved to be incorrect? How can the tree be right when the wood can be proved to be wrong?

Gosport, Hampshire. T. L. CLEAVE.

1. Keys, A., Anderson, J. T., Grande, F. *Lancet*, 1957, ii, 959.
2. Rutstein, D. D., Ingenito, E., Craig, J. M., Martinelli, M. *ibid.* 1958, i, 545.
3. Sinclair, H. M. *ibid.* 1956, i, 381.
4. Hilditch, T. P. The Chemical Constitution of Natural Fats. London, 1956.
5. Cleave, T. L. Fat Consumption and Coronary Disease: an Evolutionary Approach (with a foreword by Dr. Percy Stocks). Bristol, 1957.

INTRACUTANEOUS RIBONUCLEASE IN CHRONIC MYELOCYTIC LEUKÆMIA

SIR,—In the blood of patients with chronic myelocytic leukæmia I have observed many dead and dying leucocytes. Dead leucocytes may stimulate proliferation of bone-marrow. I have shown that the urinary ribonuclease activity of patients with chronic myelocytic leukæmia is several times higher than that of normal persons.[1] It seems that the tissues of these patients lose this enzyme abnormally; consequently enzyme autolysis of granulocytes is diminished. Perhaps that is why many dead leucocytes are present in the circulating blood.

I have made good the deficiency of ribonuclease by injecting it intracutaneously (0·5–1 mg. daily) in patients with chronic myelocytic leukæmia. The leucocytosis diminished, the spleen became smaller, and the general condition of the patients improved. Further researches are in progress.

IIIrd Clinic for Internal Diseases,
Academy of Medicine,
Kyakow, Poland. JULIAN ALEKSANDROWICZ.

A WATER-SOLUBLE DRESSING GAUZE

SIR,—Gauze impregnated with a soft paraffin, and made up in boxes which can be sterilised and sealed, has long been used for all types of wounds. It can be produced in many different sizes and is easily handled. From the patient's point of view, the dressing does not stick, nor does it cause discomfort. It can be used both on superficial lesions and in deep cavities. I have used it extensively in the casualty department of the Bristol Royal Infirmary.

In a busy department I have tried to simplify the dressing routine as far as possible. Sterile paraffin gauze was used as a dressing for burns, incisions, and most abrasions and open wounds. Other dressings are used also, but paraffin gauze was widely employed.

It was found to have some disadvantages. The soft paraffin adheres to instruments and gloves and makes them greasy so that wool or other materials stick to the forceps or hands. It cannot be washed off by immersion in sterile water unless it is either very hot or contains some solvent for soft paraffin. In many cases wounds which were dressed with paraffin gauze for more than about five days became very moist and the granulation tissue very unhealthy and œdematous. The skin edges became wet and in some cases these became reddened and even blistered, preventing the control of infection and so delaying healing. There were some wounds in which a spread occurred from the lesion to normal areas—a most irritating and alarming procedure for the patient. This could be prevented by reducing the length of time the paraffin gauze was employed, and by taking care that only one layer was used. It very soon became obvious that gauze which was over full of soft paraffin was more likely to cause trouble.

Moreover, the cleansing of the wound became very difficult. The paraffin on the skin around the wound must be removed thoroughly but this can be done only by fairly heavy and repeated swabbing.

In cooperation with Mr. G. H. Darling, our chief pharmacist, a dressing gauze which seems to have all the advantages of paraffin gauze, without its disadvantages, has been developed. To keep the wound dry one must have a gauze that will mix with both the serum of the wound and the skin secretions. It must not block the openings of the sweat glands. It must not stick to the wound and it should be easily removed from gloves and instruments.

The macrogol gauze,* which we have used for approximately

1. *Lancet*, 1958, i, 641.

* The macrogol gauze base being used consists of:

Polyethylene glycol 300	15 oz.
Polyethylene glycol 1500 GEN	3 oz.
Polyethylene glycol 4000	2 oz.

This gives a conveniently firm dressing that softens readily at body temperature.

eighteen months, is not harmful to the tissues, does not stick, and is water-soluble. Because of this the moisture in the wound and surrounding skin can pass through the gauze into the dressings outside it. It does not make the skin moist, and delayed healing and sensitisation are therefore unlikely. It can be prepared and used in a similar manner to paraffin gauze. It is easily removed from the hands, instruments, or the patient's skin, by gentle swabbing with water or saline. It causes a minimum of inconvenience for the dresser and of discomfort for the patient.

We have used it for both daily and less frequent dressings and it does not appear to delay healing nor does it give rise to any unpleasant odour. The macrogol gauze can be prepared with any desired percentage of an antibacterial agent. We have used it with 0·2% nitrofurazone in it, but this was abandoned when reports of sensitivity appeared.

Many people are dissatisfied with preparations of soft paraffin gauze and I am sure that these difficulties must have been overcome in a diversity of ways; but in our experience macrogol gauze is a very satisfactory dressing with a wide range of application.

After clinical trials had shown the gauze to fulfil all the claims made for it, we gave the formula to Messrs. Smith & Nephew, and we are now using their preparation called ' Carbonet '.

Bristol. H. K. BOURNS.

AN UNUSUAL SOURCE OF MERCURY IN PINK DISEASE

SIR,—The relation between mercury and pink disease has been much discussed, and though the consensus of opinion seems to hold that a direct causal relationship is " not proven," there is good evidence that the frequency of the association is more than incidental. The sources from which infants may absorb mercury are usually fairly well defined (teething powders, mercurial ointments, vermifuges, &c.). The case described here seems to be of interest since it involves an unusual source of mercury absorption in the infant.

A boy child, aged 2½ years, was admitted to the Hospital for Sick Children, Great Ormond Street, under the care of Dr. Wilfrid Sheldon, in May, 1958, after a series of epileptiform convulsions. He was a third child, and there was no history of birth trauma nor any family history of neurological disease or fits.

His development had been possibly slightly retarded (he sat up at ten months, walked at twenty months, and at the age of two years spoke only a very few single words), but he had been otherwise well until October, 1957. At this time the whole family had influenza, and he had an acute pyrexial illness and a convulsion. He was admitted to the local hospital but made a quick recovery and no abnormality apart from his mental slowness was noted.

The child remained well until April 29, 1958, when quite suddenly he had a series of convulsions which continued for thirty-six hours until controlled by sedation. He was admitted to a local hospital where it was thought that he had become both deaf and blind and where a lumbar puncture was performed and found to be normal.

On arrival at Great Ormond Street he was fully conscious but very irritable and tended to lie in the prone position with his legs curled under him and his eyes turned away from the light. He had a cold pinkness of his extremities, a mild desquamating rash over the lower part of his trunk, and an angular stomatitis. His pulse-rate was 120 and his blood-pressure 130/90 mm. Hg. Examination of the central nervous system revealed no localising abnormality; he could see and hear well, but his mental state was obviously retarded for a child of 2½ years. Investigations included chest and skull X-rays, electroencephalography, serum-calcium, phosphorus, urea and sugar, urine for abnormal metabolites, Wassermann reaction, and blood-count, which were all essentially normal, but the erythrocyte-sedimentation rate was 40 mm. in one hour, and a twenty-four-hour specimen of urine showed an excretion of 207 µg. of mercury.

A further history taken from the parents at this stage did not reveal any access to mercury from any of the usual sources, but on close questioning it was discovered that just before the onset of the fits the lawn had been dressed with lawn sand. The weather had been fine at this time and it was some four days before rain washed the sand into the earth. In the meantime the child had been playing on the lawn most of each day. The child was not seen to eat the sand, but later in the ward he showed the usual tendency of his age to put everything in his mouth. A specimen of this lawn sand was found to contain about 1 part in 50,000 of mercury.

The child's subsequent progress was slow but uneventful. He remained irritable for some days and showed a tendency to an inverted sleep rhythm with wakefulness at night and drowsiness in the day. Before discharge the urinary mercury excretion was 17 µg. in twenty-four hours.

When last seen in June his good progress had been maintained, though he was backward in his speaking and had had two short episodes of urticaria.

Mercurised lawn sand is a dressing applied to lawns to kill unwanted moss. Its use is quite extensive in this country. The possibility of absorption of mercury from this source has not, to my knowledge, been recognised and I hope this case will draw attention to the fact.

I should like to thank Dr. Wilfrid Sheldon for permission to report this case and for his help and advice in the preparation of the text.

Evelina Children's Hospital, London, S.E.1. J. W. SCOPES.

LECTURES ON TAPE

SIR,—I have just read your note [1] about the suggestion of Graves and Graves [2] that there should be a central library of tape-recordings and a collection of machines for hire.

Each month about 30,000 American and 1000 Canadian doctors are doing just what this note suggests—i.e., keeping up with advances in medicine and surgery by listening to tape-recordings prepared by our organisation.

The Audio-Digest Foundation (a non-profit subsidiary of the California Medical Association, whose excess reserve funds are contributed to America's 79 medical schools) issues 5 different series of programmes. Subscribers to surgery, internal medicine, obstetrics-gynæcology, and pædiatric programmes receive a new hour-long tape every two weeks; those in general practice receive new programmes each week.

The tape-recordings themselves survey the current world literature and provide the rural practitioner with expert scientific lectures by leaders in world medicine. Each programme contains at least 2 fifteen-minute lectures by an expert in his chosen specialty.

I write to let your readers know how many of their American and Canadian colleagues are keeping up with medical advances, and to suggest that these tapes (with appropriate equipment) might be set up in central locations throughout the British Isles for the use of interested doctors.

In America the annual subscription to the specialties is $81.50, and for the weekly general-practice series it is $162. At present, customs and excise difficulties prevent the importation of our programmes into England, but with enough interest from the British medical profession it is possible that these obstacles might be overcome.

1919, Wilshire Boulevard, Los Angeles, 57, California. CLARON L. OAKLEY Editor, Audio-Digest Foundation.

1. *Lancet*, 1957, ii, 1346.
2. Graves, J. C., Graves, V. *Research Newsletter*, College of General Practitioners, 1957, **4**, 325.

BIOCHEMICAL CONCEPTS OF SCHIZOPHRENIA

SIR,—Dr. Smythies, in his interesting review (Aug. 9), refers to the observations of Örström and Skaug [1] upon adenosine triphosphate (A.T.P.) turnover by the blood cells of schizophrenic patients. So far as is known no report has appeared since 1951 [2] which bears upon these findings. We have found no differences in the rates at which ^{32}P, added to whole blood incubated at 37°C for 60 minutes, is incorporated in the A.T.P., inorganic phosphate, 2 : 3-diphosphoglycerate, and hexose monophosphate fractions of six female psychiatric patients (aged between 18 and 35, three of whom were suffering from schizoid disorders and three from neurotic disturbances). The uptake by the cells of all six subjects are within $\pm$ 1 standard deviation of the mean values obtained on 6 separate observations with the blood of five normal subjects in this laboratory. Neither was there any difference in the phosphate content of the fractions examined.

Department of Pharmacology,
London Hospital Medical College,
London, E.1. J. L. H. LAITY.

DEATH OF A BOXER

SIR,—A number of physicians have written that in long associations with both amateur and professional boxing they cannot recall any cases of cerebral injury. Having examined many boxers over many years, I have seen numerous cases of cerebral and other injuries in amateur and professional boxers and reported them in detail. In this letter I shall confine myself to a few selected references.

In 1942 I described [3] a young amateur boxer who died as a result of a blow to the jaw. The fight was held under the supervision of the appropriate boxing authorities. Necropsy revealed a laceration of the left temporal lobe and an extensive intracranial hæmorrhage.

In 1947 I reported [4] the death of a 23-year-old professional boxer who " participated in a public fight under the auspices of the Board of Control for Professional Boxing and Wrestling ", with a medical officer in attendance. He was knocked out and remained unconscious for several days. An emergency operation was performed and a right-sided subdural hæmorrhage drained. The patient died a fortnight later, postmortem examination revealing some old blood clot adhering to the inner surface of the dura mater, and purulent meningitis.

In 1956 I mentioned [5] 2 cases of boxing injuries to the midbrain, one concerning a young man who died on the 21st day after a fight in which he was knocked unconscious. At necropsy tissue softening throughout the brain-stem was found. The other case was that of a 24-year-old boxer who had been in the ring for many years and who, following a fight, suddenly noticed tremor of the left hand which rapidly spread towards arm, shoulder, and head, leading within a short time to the development of a typical parkinsonian picture.

In 1948 I detailed [6] 10 cases of boxing injuries to the eyes in previously healthy men, among them tears in the iris with hyphæma, cyclodialysis, traumatic choroiditis followed by detachment of the retina, choroidal tears near the fundus, hæmorrhages in the vitreous body, widespread macular changes, and rupture of the lamina elastica posterior. These findings were subsequently corroborated by Doggart [7].

In 1944 I told [8] the story of the fatal collapse of a boy, aged 10, after a regulation boxing fight, necropsy revealing an organised occluding thrombus in the coronary artery. There were fresh extravasations of erythrocytes between intima and media around the occluded area. The latter had, I think, been caused by the blows received during the boxing fight and initiated the chain reaction which led to the child's death.

In 1950 you published [9] an editorial which I felt summed up the argument. In 1956 I made a comprehensive review [10] of the evidence as it was then available in the literature.

In case it should be argued that the percentage incidence of boxing injuries is small, I refer to two competent electroencephalographic studies on amateur boxers.[11 12] The implications of these two investigations are truly devastating in that they prove a much greater vulnerability of the brain to the kind of blunt traumata that are common in boxing than had previously been suspected.

The medical facts about boxing are no longer in question. But it is certainly a problem of far-reaching psychological and moral significance that issues like this which call for radical social action on the part of our profession, still find vociferous defenders.

University of Kentucky,
Lexington, Kentucky. ERNST JOKL.

SURGERY FOR PULMONARY TUBERCULOSIS

SIR,—I am very interested to read in your report of the conference on chest diseases (July 19, p. 142) that the therapeutic compass is pointing away from surgery in pulmonary tuberculosis. That, in my view, is not necessarily so for the patient whose career is an arduous one and who wishes to pursue it (for example, the fighting soldier) or who wishes to emigrate to a country with stringent rules barring tuberculous subjects.

Admittedly there is normally no case for resection, in suitably localised reversible disease, in the absence of drug resistance. In the past non-cavitated apparently solid disease, thought to be irreversible, may have been resected because it was not appreciated that some such lesions may show almost complete radiological resolution after 12 months or more of chemotherapy.

In the first 75 Gurkha patients with tuberculosis on long-term chemotherapy who were referred by me from Malaya for partial lung resection in the Army Chest Centre, 8 (10·6%) were removed from the surgical list after the following periods of chemotherapy (months): 23, 23, 21, 21, 17, 16, 15, and 12. The unusual drug regime used was streptomycin (1 g. daily) and isoniazid (2 × 100 mg. daily) for at least 30 days. Thereafter, both drugs in the doses stated were given together on the same day every second day.[13 14] Radiological resolution proceeded so far that surgery was no longer considered necessary. The proportion of withdrawals is less than some surgeons experienced in the days of long surgical waiting-lists and when long-term preoperative chemotherapy was the exception in this country.

It is not disputed that with long-term chemotherapy, in the absence of emergence of resistant strains of *Mycobacterium tuberculosis*, bacteriological examination of apparently irreversible lesions shows a progressively high sterilisation-rate of such lesions the longer the preoperative course of chemotherapy. Nevertheless in my opinion this must not give cause for complacency, especially when young people are treated with long-term chemotherapy alone, particularly when we consider the increased, almost alarming, rate of notifications in the older age-groups, indicating the resurgence of active tuberculosis in the vicinity of pulmonary lesions formerly considered quiescent or healed.

There is, of course, a case for not advising surgery for patients on long-term chemotherapy in the absence of resistant

1. Örström, A., Skaug, O. *Acta psychiat., Kbh*, 1950, **25**, 437.
2. Örström, A. *Arch. Biochem.* 1951, **33**, 484.
3. *Lancet*, 1942, i, 603.
4. *ibid.* 1947, i, 888.
5. *Trans. Amer. neurol. Ass.* 1956, p. 125.
6. *Arch. Ophthal., N.Y.* 1948, **39**, 643.
7. *ibid.* 1955, **54**, 161.
8. *Lancet*, 1944, ii, 659.
9. *ibid.* 1950, 1006.
10. *Zbl. Neurochir.* 1956, **16**, 28.
11. Larsson, L. E., Melin, K. A., Nordstrom-Ohrberg, G., Silferskiold, B. P., Ohrberg, K. *Acta psychiat., Kbh.* 1954, suppl. 95.
12. Pampus, F., Grote, W. *Arch. psychiat.* 1956, **194**, 152.
13. Mackay-Dick, J., Rothnie, N. G. *Tubercle*, 1954, **35**, 182.
14. Mackay-Dick, J., Slattery, D. A. D. *Brit. med. J.* 1958, i, 888.

strains, for there is presumptive evidence that *Myco. tuberculosis* will be exterminated in most, if not all, lesions.

Nevertheless, the patient should also be informed of the excellent results of resection in suitably localised irreversible disease in these days of skilled thoracic surgery, negligible operative mortality-rate, and slight incidence of complications. As your report rightly says, not only the age and sex of the patient but the extent, irreversible character, and destructiveness of the disease must be considered. To that must be added the patient's career, with particular reference to careers involving severe strain and possible emigration.

In certain countries evidence of tuberculosis of the lungs bars acceptance of potential immigrants. The reaction of such authorities to the applicant with radiological evidence of pulmonary tuberculosis, no matter the duration of successful long-term chemotherapy and however fit and bacteriologically negative he may be, can be well imagined.

It seems there will always be absolute indications for resection in pulmonary tuberculosis—e.g., destroyed lung, bronchostenosis, bronchiectasis, rigid cavities, &c.). It is my belief that the case for resection is as strong as ever, the only difference being that the time for surgery in many of the specially selected cases may be much later than formerly. This aspect of the case for surgery should be represented to the patient with the same skill as the opposite view and with special reference to his future career. After all it is the patient with whom the final decision should rest. Failure to give him an impartial briefing on both sides of the question of long-term chemotherapy with or without resection means that the pendulum is swinging into the dark and the compass bearing is not reliable.

Army Chest Centre,
Hindhead, Surrey. JOHN MACKAY-DICK.

FAILURE OF DETERGENTS TO DISINFECT

SIR,—We were most interested in your annotation of Aug. 9 regarding " failure of detergents to disinfect ".

There is, of course, evidence to support the claim that quaternary ammonium compounds show greater activity against gram-positive than gram-negative organisms, and it is also true that *Pseudomonas pyocyanea* seems to be one of the most resistant organisms; but at the same time the evidence does indicate that, in the dilutions recommended for ' Zephiran ', even *Ps. pyocyanea* should be killed within ten minutes. That this is so is also pointed out by Plotkin and Austrian [1] whom you quoted. They reported 40 cases of bacteræmia (not septicæmia) due to *Ps. pyocyanea*, the result of unsatisfactory skin disinfection using swabs saturated in a 0·1% solution of zephiran. It was pointed out that all of them were due to this organism growing in a solution of zephiran from which most of the quaternary had been adsorbed into swabs stored in it so that the concentration of the solution was lowered to an ineffectual level. They emphasise " the potential hazard of infection from the improper use of such solutions ". We are therefore dealing with errors of technique rather than the ineffectiveness of the disinfecting agent.

I believe that in this country quaternary ammonium compounds are frequently used for the sterilisation of heart-lung machines and up to the present this appears to have proved completely successful. Again, this seems to suggest that matters of technique might have been at fault.

You mention that quaternary ammonium compounds are not very satisfactory skin disinfectants and for this purpose 2% iodine in 70% spirit is still supreme. It is interesting to recall that Gardner [2], while supporting the efficacy of tincture of iodine for skin sterilisation, also concluded that the detergent zephiran in 70% ethyl alcohol gave satisfactory disinfection in 30 to 45 seconds.

While fully recognising the problem posed by the difficulty in eliminating *Ps. pyocyanea* because it is the most resistant organism to quaternary ammonium disinfectants, it is a rather widespread generalisation to conclude that quaternary ammonium disinfectants are as specific in their action as sulphonamides. I feel that the conclusion should be that just as heat sterilisation must be done correctly in order to prevent the innumerable failures that have been observed because of insufficient heating or faulty autoclaves, &c., so similarly the quaternary ammonium compounds must be used with the knowledge of their properties and according to the suggested routines in order for them to prove the effective agents they are.

Bayer Products Ltd.,
Kingston-on-Thames,
Surrey. K. BOHEIMER.
Medical Adviser.

1. Plotkin, S. A., Austrian, R. *Amer. J. med. Sci.* 1958, **235**, 621.
2. Gardner, A. D. *Lancet*, 1948, ii, 760.

DEVELOPMENT OF RESPIRATORS

SIR,—I was very interested to read your leader of Aug. 9, in which you attribute priority for the inception of the alligator principle in respirator cabinet design to Both and imply that it was his model which prompted the manufacture of cabinets of this type in the United Kingdom. It seems fair to point out that, independently and without any knowledge of Both's alligator model, Capt. G. T. Smith-Clarke in Coventry in 1952 conceived, designed, and built a quarter-scale model of an alligator respirator—later put into production as the Smith-Clarke cabinet respirator.[1 3]

It was in the following year (1953) that the Ministry of Health bought for trial two of Both's new alligator-type machines.[2] Again, in 1952, Captain Smith-Clarke modified (with due regard to the draft performance specification of the Ministry of Health, breathing-machines group) five of the original Nuffield (Both) respirators.[3] His pattern of modification was later adopted as the standard scheme for the country at large. The items in this modification did not at first include a split-head which was added at a later stage—i.e., after Captain Smith-Clarke had already designed his alligator.

Whilst on the subject of Captain Smith-Clarke's work it is tempting to recall some of his other contributions to respirator practice in *this* country, such as the ingenious hand-pumping arrangement on the modified Nuffield motor-bellows unit,[3] his infant and child-size cabinet respirators, his adoption of the wrap-over neck collar, his positive-pressure attachment for use when a cabinet is opened,[4] his mechanised inspiratory-expiratory valve and arrangement for optional negative pressure as fitted to his intermittent positive-pressure respirator,[5] his robust and powerful foot sucker,[6] and finally the Smith-Clarke standard testing unit.[7]

The story of these developments is set out in the James Clayton lecture [8] given in 1956.

Whitley Hospital, Coventry. J. F. GALPINE.

ULCERATIVE COLITIS

SIR,—Dr. Sim and Mr. Brooke (July 19) seem to me to misrepresent the current psychosomatic concept of the ætiology of ulcerative colitis. Do they really believe that dependable information can be got (*a*) by questionnaire, (*b*) retrospectively, and (*c*) by seeking answers to questions which are not relevant to the psychopathology of the disease—notably the incidence of anxiety and depression?

I can think of no important contribution to the subject in recent years in which anxiety and depression have been considered paramount in the ætiology. Excessive dependence and

1. Galpine, J. F. *Lancet*, 1954, i, 707.
2. Report of the Medical Research Council for the year 1956–57; p. 12. H.M. Stationery Office.
3. Smith, R. E. *Lancet*, 1955, i, 674.
4. Galpine, J. F. *ibid.* 1954, i, 1013.
5. Smith-Clarke, G. T., Galpine, J. F. *ibid.* 1955, i, 1299.
6. Galpine, J. F., Brady, C. *ibid.* 1955, ii, 1340.
7. Galpine, J. F., Smith-Clarke, G. T. *ibid.* 1955, i, 722.
8. Smith-Clarke, G. T. Mechanical Breathing Machines. James Clayton Lecture, 1956. Institution of Mechanical Engineers.

emotional immaturity; extreme sensitivity, inability to cope with real or imagined insults, often verbal; the open expression of anger replaced by a disposition to brooding resentment over periods of weeks, months, or years, are all to be found in these patients, but they are not likely to be uncovered by the methods adopted by Dr. Sim and Mr. Brooke.

I do not understand the importance they attach to which comes first, bleeding or diarrhœa. It seems quite irrelevant to the truth or untruth of the psychosomatic concept. It probably depends on whether disturbance in mucosal vascularity or motility and secretion predominates, and upon which area of the large gut is mainly affected, and the degree of severity.

If, as Dr. Sim and Mr. Brooke seek to prove, ulcerative colitis is not a psychosomatic disease, how do they account for the accumulating reports, from Holland, U.S.A., and this country, that psychotherapy is efficacious?

Ipswich. J. W. PAULLEY.

CHRONIC PSYCHONEUROSIS IN GENERAL PRACTICE

SIR,—I enjoyed Dr. Watts' readable chatty article in your issue of Aug 16, but I think him unduly pessimistic about the chances of cure. One reason for this may be his frequent use of phenobarbitone. The barbiturates have an immediate sedative action but this is followed by toxic depressant effects in proportion to the dosage. They also render patients less accessible to psychotherapy, particularly re-educational psychotherapy, since they tend to dreaminess and letting the world go by rather than to tackling the causes of basic maladjustments in which the neuroses have their origin.

I also think it fatal to give in to a neurotic patient's demand for a placebo. A bottle of medicine signifies for him organic, as opposed to neurotic, illness, and an essential step in the treatment of the psychoneurotic is to secure his acceptance of the psychogenic nature of his symptoms—often against strong resistance on his part.

Wallasey, Cheshire. LENNOX JOHNSTON.

COUDÉ STRAIGHTENED OUT

SIR,—In the winter number (vol. 4, no. 6) of *The Leech*, the journal of the Cardiff Medical Students' Club, there appeared an article on Emile Coudé (1800–70), a surgeon of Niort, France, who, it was alleged, invented, and in 1835 published an account of, the Coudé catheter.

This biography was written in a serious and restrained vein, and was replete with two references, one to the autobiography of Emile Coudé, and another to *Le Mois Médical* for a description of the invention. In addition, the article contained a reproduction of a woodcut purporting to be a likeness of the inventor.

We have been able to prove that the whole of this article is a fabrication, and the references are fictitious. To expose this deception is of practical importance. As a result of the hoax, a number of pages of the 11th edition of *A Short Practice of Surgery* that were passed for press have had to be reset in so far as the capital C of Coudé is concerned, and biographical footnotes to Emile Coudé deleted.

To save others from falling into this mire, we hope that you will publish this letter. The coudé catheter was invented by Louis Mercier (1811–82), the eminent Paris urologist, so well known for his description of the inter-ureteric bar. Mercier announced the invention of the coudé catheter in 1836, and of the bi-coudé catheter in 1841. Being translated, coudé (the adjective) means bent; coude (the noun) means elbow.

HAMILTON BAILEY.

W. J. BISHOP.
Editor, *Medical History*.

A. CLIFFORD MORSON.
President of the Société Internationale d'Urologie.

Obituary

KENNETH WELDON GOADBY

K.B.E., M.R.C.S., L.D.S., D.P.H.

Sir Kenneth Goadby, who died on Aug. 10 at Walton-on-the-Hill at the age of 85, was a bacteriologist who practised his specialty in the borderlands of medicine, and he will be remembered for the resource and vigour with which he applied its techniques to the problems of odontology and industrial medicine.

He was born at Gravesend, the son of the Rev. J. J. Goadby, and was educated at the Grammar School, Henley-on-Thames, and at Reading University. He began to study dentistry as an apprentice, but an uncle offered him the opportunity to take a dental qualification, and after a course at Guy's Hospital he qualified in 1896. While he was practising as a dental surgeon he went on to take his medical qualification in 1900 and the D.P.H. a year later. He was still a student at Guy's when he met J. W. Washbourn, who first interested him in bacteriological research, and from 1899 to 1902 Goadby spent part of his time working in Washbourn's laboratory at Guy's. In 1903 he was awarded the Tomes prize of the Royal College of Surgeons of England.

Shell

The following year he was appointed lecturer in bacteriology at the National Dental Hospital, and he continued to hold this appointment after the hospital became the dental department of University College Hospital. Here he was drawn into the circle of A. V. Hill, Barcroft, Dale, Adrian, and Walter Fletcher. He was later lecturer in oral hygiene at the London School of Hygiene. In 1923 he drew together in his *Diseases of the Gums and Oral Mucous Membrane* what he had over the years learnt and thought about oral bacteriology. He interpreted his subject generously, and described not only the diseases of the title but also the effect of mouth conditions on general health, with warnings on the bacterial dangers of whole-scale extractions and on the effect of vitamin deficiency on the jaws and gums of infants. In an authoritative section on metallic poisoning of the mouth he drew on his wide experience of industrial toxicology, for he had for many years been one of the Home Office's specialist medical referees for industrial poisoning. He sat on departmental committees dealing with the phosphorus rules for match factories and the causes of lead poisoning in industrial processes. He was a member of the medical advisory committee of the Ministry of Mines. During the 1914–18 war he also served on the War Office committee on tetanus and as honorary bacteriologist for vaccine therapy at the Royal Herbert Hospital, Woolwich. For this work he was appointed K.B.E. in 1918.

Throughout his life he had always been something of a lone wolf, and after the 1914–18 war he devoted himself to private practice. But he remained alert to new problems and new interests. Towards the end of his life he was active at the meetings of the Physiological Society and he published in 1949, with his son Dr. H. K. Goadby, a paper on the nervous pathway of the psychogalvanic

reflex. He held his lectureship at U.C.H. till 1947, and, J. L. D. B. recalls,

" He was an ever familiar figure at students' society dinners, where he made a point of speaking to all his colleagues and friends. Though we saw little of him in later years, he will always be remembered as an enthusiast in his own subject and a great lover of social functions, where he mixed freely with the students."

He was one of the original members of the medical committee of the Scientific Film Association, which was started in 1942, and later became president of the association. R. Mac K. writes:

" Sir Kenneth Goadby gave sterling help in promoting the use of films in medicine and health education. As chairman from 1947 to 1952 of the medical committee he gave generously of his time, guiding gently, in a most friendly way the enthusiasm, impetuous at times, of his younger colleagues. This was after he retired from his hospital work but he always took in new ideas and put the good ones into action. When he resigned as president he was made the first (and only) honorary vice-president of the Association."

He married in 1898 Constance Eva Olding, and leaves one son.

JOHN JEFFREYS DENNIS

C.B., M.D., M.Ch. Q.U. Irel.

Surgeon Rear-Admiral Dennis died at his home at Beaconsfield on Aug. 4, some months after his 100th birthday.

He was the son of Paymaster-in-Chief T. R. Dennis, R.N., and he was educated at Mannamead School, Plymouth. He studied medicine in Cork and Dublin, and in 1880 he was one of the last graduates of the Queen's University of Ireland (which in that year became the Royal University of Ireland). In 1881 he joined the Royal Navy as a surgeon, and the following year saw service in Egypt and received " an expression of Their Lordships' satisfaction " for his able performance of his duties. In 1892 he was promoted staff surgeon, and he was surgeon of H.M.S. *Turquoise* during operations in the Eastern Sudan in 1884–85, when he was awarded the Egyptian medal and the Khedive's bronze star. For the next two years he served with the Naval Brigade and he landed with the Army during the Burma Annexation War. He was present at the capture of Mandalay and took part in an expedition to Bhamo.

In 1896 he was appointed fleet surgeon, and he again saw active service when he was with H.M.S. *Highflyer* during the naval and military operations in Eastern Somaliland from 1902 to 1903. In the course of his African service he qualified as an interpreter in Swahili. In 1907 he was promoted deputy inspector-general and six years later surgeon general. During the 1914–18 war he was medical officer in charge of the R.N. Hospital, Haslar, Gosport, and he was appointed C.B. in 1916 for his work there. He was placed on the retired list in 1918. He was made a commander of the Ordre de la Couronne Belge in 1919.

Appointments

CLARK, J. A. L., CH.M. Edin., F.R.C.S.E.: consultant surgeon, Stracathro Hospital, Brechin, Angus.
CLARKE, MARY D., M.B. Lond., M.R.C.P.: assistant M.O., Hertfordshire.
DICK, SHEILA M., L.R.C.P.I.: assistant M.O. and school M.O., Rothwell division of Yorkshire.
DUNN, A. S., L.R.C.P.E., D.C.H.: assistant divisional M.O., Bury (near Manchester) area.
GARFIT CLOWES, LOUISE, M.B. Belf., D.P.H.: assistant M.O., Surrey.
KERSHAW, J. B., M.B. Lond., D.P.H.: M.O.H., Hinckley and Market Bosworth.
LATHAM, ALICE, M.B., B.SC. Wales, D.OBST., D.C.H.: assistant M.O., Surrey.
MACINTYRE, SHEILA, M.B. Glasg., D.P.H.: assistant M.O.H., Argyllshire.
MORGAN, T. H., M.B. Cantab., F.R.C.S.: consultant in traumatic and orthopædic surgery, Swindon/Cirencester area hospitals.
MOUAT, J. S. V., M.B. Aberd., D.P.M.: assistant psychiatrist (S.H.M.O.), Prudhoe and Monkton Hospital.
MURRAY, B. A., M.B. Dubl., D.P.H.: assistant divisional M.O., Lancaster area.
OWEN, KENNETH, M.S. Lond., F.R.C.S.: surgeon, St. Peter's, St. Paul's, and St. Philip's Hospitals, London.
YEALLARD, M. F. T., M.B. Cantab., M.R.C.P.: part-time consultant neurologist, Addenbrooke's Hospital and regional hospital board hospitals.

Notes and News

ON RONGELAP AND AILINGINAE

ON March 1, 1954, a thermonuclear device was fired on Bikini atoll in the United States Atomic Energy Commission's Eniwetok Proving Grounds in the Marshall Islands. This on-the-ground detonation generated large quantities of radioactive substances, and after the explosion unforeseen wind changes carried these materials in unexpected amounts to inhabited atolls, the nearest of which were Rongelap (about 100 miles distant) and Ailinginae (75 miles). In a lecture at Guy's Hospital last week, Dr. Eugene Cronkite, of Brookhaven National Laboratory, New York, described some of the consequences of this accident. It is important to realise that this ground burst created a situation which has no close relevance to the question of long-continued worldwide fallout from nuclear weapons fired at a great height.

267 persons on four atolls were exposed to this dense local fallout. The best estimates of the possible whole-body doses of γ-radiation in air up to the time the atolls were evacuated (between fifty and sixty hours after the explosion) were 175 r on Rongelap and 69 r on Ailinginæ. Soft γ- and β-radiation from fallout on the ground and particularly on the skin itself gave a superficial dose high enough to produce skin lesions and epilation. These changes were first observed two to three weeks after exposure on skin contaminated by fallout, and the first evidence of damage was increased pigmentation in the form of dark brown to black macules, papules, and raised plaques. In about 20% of the people most heavily exposed deeper ulcerating lesions developed, usually on the feet or neck. Most of them healed rapidly. Regrowth of hair, of normal colour and texture, began about nine weeks after exposure and was complete at six months. 23 Japanese fishermen were exposed to the same fallout, and in them the severity and course of the skin lesions seemed to be similar to those observed in the Rongelap Marshallese.

Blood changes in those exposed on Rongelap indicated the following course of events [1]:

(i) The total white count increased during the first two or more days and then fell below normal. The count then fluctuated for some weeks and became stabilised at a low level during the seventh or eighth week. About the ninth or tenth week it began to go up again, but complete recovery might take several months or more. Neutrophil counts took a parallel course.

(ii) The drop in lymphocytes was early and profound and the count may not return to normal for months or years.

(iii) The platelet count fell regularly, reaching a minimum on the thirtieth day. Some recovery was evident early, but it might not be complete several months after exposure. Dr. Cronkite said that platelets might drop as low as 25,000 per c.mm. before bleeding began as the result of irradiation.

The depression of peripheral cellular elements in the blood suggested that exposure on Rongelap was moderately severe, probably within 50 to 100 r of the level where some fatalities would have resulted.

Speaking of the treatment of persons exposed to high doses of total-body γ-radiation, Dr. Cronkite observed that transfusion might be more hazardous than radiation. The Japanese fishermen had been vigorously transfused, and serum hepatitis might have done some of them more harm than they would otherwise have suffered. Only when doses were thought to be in the uniformly lethal range would he advise active treatment, such as transplantation of bone-marrow. Otherwise the patient should be observed and conditions treated as they arose.

OSTEOPATHY

THE origin and development of osteopathy in Great Britain are described in *The Osteopathic Blue Book*,[2] which is claimed to be the first authoritative account of its sort. One of the main aims of those who produced this book was to enable the public to differentiate between osteopaths who have been trained as such and those who have not.

1. Some Effects of Ionizing Radiation on Human Beings. U.S. Atomic Energy Commission, July, 1956.
2. Compiled and issued by the General Council and Register of Osteopaths Ltd., 16, Buckingham Gate, London, S.W.1. Pp. 78.

RISING COSTS AND DIVIDED RESPONSIBILITIES

THE development scheme at the Radcliffe Infirmary, Oxford, continues to incur authoritative displeasure. At the beginning of this year the Comptroller and Auditor General, criticising it under a transparent veil of anonymity, pointed out that the original estimate of £434,390, made in 1955, had been allowed to grow to £1 million, and that a considerable amount of work had been started "without the Ministry's prior authority"[1]. The Ministry of Health, though not defending the methods of the board of governors of the United Oxford Hospitals, have admitted that they are satisfied that the scheme will not cost substantially more than if a more orthodox procedure had been followed. But the Committee of Public Accounts[2] now challenge this Ministerial clemency, and firmly state that they have no doubt that "substantial economies could have resulted had the work been properly planned in advance and had the various additions requested during the course of the work been critically examined by the Ministry and the Treasury before being put in hand." The "unenlightened rush" which had taken the place of advance planning and critical examination of the work in process must, in the committee's view, account for part of the increased cost.

Putting aside the debatable question as to whether the extra expenditure was avoidable, the committee is concerned that the board should have been able "under extreme pressure by the University" to commit the Ministry to expenditure which had not been approved. Though the primary responsibility for these irregularities must rest with the board, the committee tax the Ministry with ineffective supervision which had "considerably weakened Treasury control over the expenditure." They ask for a review of the Ministry's arrangements for financial control of large building projects and suggest that this is especially necessary where responsibility is divided between a board and a university.

The Ministry has already recognised the importance of adjusting the balance of financial responsibility between hospital and academic principals, and, with the Treasury and the University Grants Committee, have devised a formula[3] defining in principle what a university's contribution should be towards the cost of a building to be shared with a teaching hospital. This formula had not been agreed when the original arrangements for the Oxford scheme were made. The University of Oxford's promised contribution to a total which was then £434,390, was £170,500, with a further £31,500 towards equipment. The Ministry consider that the part of this contribution (£138,500) allocated to the work that has already been done is not less than the university's contribution should be under the formula, but the proposed contribution towards the remaining work and towards equipment is much less than it would be under the formula. The university is unable to find more money, and in the circumstances the Ministry, in consultation with the Treasury and the U.G.C., have agreed not to seek a further contribution. The whole of the expenditure will therefore have to be met from the Vote for the National Health Service and will reduce the amount available for capital expenditure for the service. The committee feel that this is an improper use of moneys voted for the health service, and they recommend that in future commitments to provide facilities and equipment which are not strictly an N.H.S. liability should not be made until money is available to meet them from sources other than the Health Service Vote.

University of Cambridge

On Aug. 2 and 5 the following degrees were conferred:

M.D.—F. Ashton, A. L. T. Easton, P. M. O. Massey, George Meachim, *Vishnu Sarma, Leonard Weiss.

M.B., B.Chir.—*I. F. M. Buchanan, R. C. L. Feneley, *J. G. Lancaster.

M.B.—*P. J. Ball, D. A. Birkett, *Shirley A. Bolt, *E. P. Brooks, F. T. Brough, Jan Chippendale, G. M. Davies, *Nerys Davies, *A. J. Earl, Audrey E. Fairey, A. F. Fleming, John Hedley-Whyte, N. E. S. Holden, *I. D. Hunter-Craig, R. H. Johnson, N. W. Oakley, *Allan Reynolds, *Heather M. Rumsey, *W. G. Shakespeare, *Margaret R. Skelton, A. C. Smith, G. C. Sutton, J. C. Twomey, H. B. Valman, D. M. Whiteford.

* By proxy.

1. See *Lancet*, 1958, i, 303.
2. H.M. Stationery Office. 1958. Pp. 32. 1s. 6d.
3. See *Lancet*, 1957, ii, 498.

Royal College of Obstetricians and Gynæcologists

ON Friday, Sept. 26, at 5 P.M. at 1, Wimpole Street, London, W.1, Mr. V. B. Green-Armytage will give the Green-Armytage Anglo-American sterility lecture. His subject will be recent advances in the surgery of infertility. Tickets may be had from the secretary at the college, 58, Queen Anne Street, W.1.

Royal Society of Medicine

Anæsthetic section.—This section is offering a prize (£30) for the best paper submitted by a senior registrar or registrar holding a clinical appointment in an anæsthetic department or hospital.

Fellowship of the society is not necessary for entry. The subject will be of the author's choice but must be connected with anæsthesia. All papers must be submitted by Jan. 1. Further details can be had from the hon. secretary of the section, 1, Wimpole Street, London, W.1.

British Medical Association

This Association is offering the following essay prizes:

A Sir Charles Hastings prize (£75) and a Charles Oliver prize (£50), open to members who are in general practice; a provisionally registered practitioners' prize (£50); and a medical students' prize (£25).

Further particulars may be had from the secretary, B.M.A. House, Tavistock Square, London, W.1.

Freud Centenary Fund

The trustees of this Fund are prepared to give financial support to a small number of applicants who have been accepted, or are eligible, for training at the Institute of Psycho-Analysis in London.

This support may take the form of a loan (repayable without interest) or of a grant to cover all or part of the training expenses, and the trustees may grant additional funds in cases of exceptional promise. All inquiries should be addressed to the hon. secretary of the Fund, 20, Maresfield Gardens, N.W.3.

Darwinism and the Study of Society

To mark the centenary of *The Origin of Species*, a conference on this subject will be held in Adam House, Edinburgh, from April 8 to 10. Further particulars may be had from Dr. M. P. Banton, 39, George Square, Edinburgh, 8.

Pneumoconiosis and Byssinosis Benefit Scheme

Widows and other dependants claiming the death benefit of up to £300 provided under this scheme have been given rights of appeal against an unfavourable decision as to the cause of death (S.I. 1958 no. 1240). Up to now the medical decision on a claim for death benefit has been final.

Society for the Study of Fertility

The annual conference of this society will be held next year on May 28, 29, 30 in Dublin.

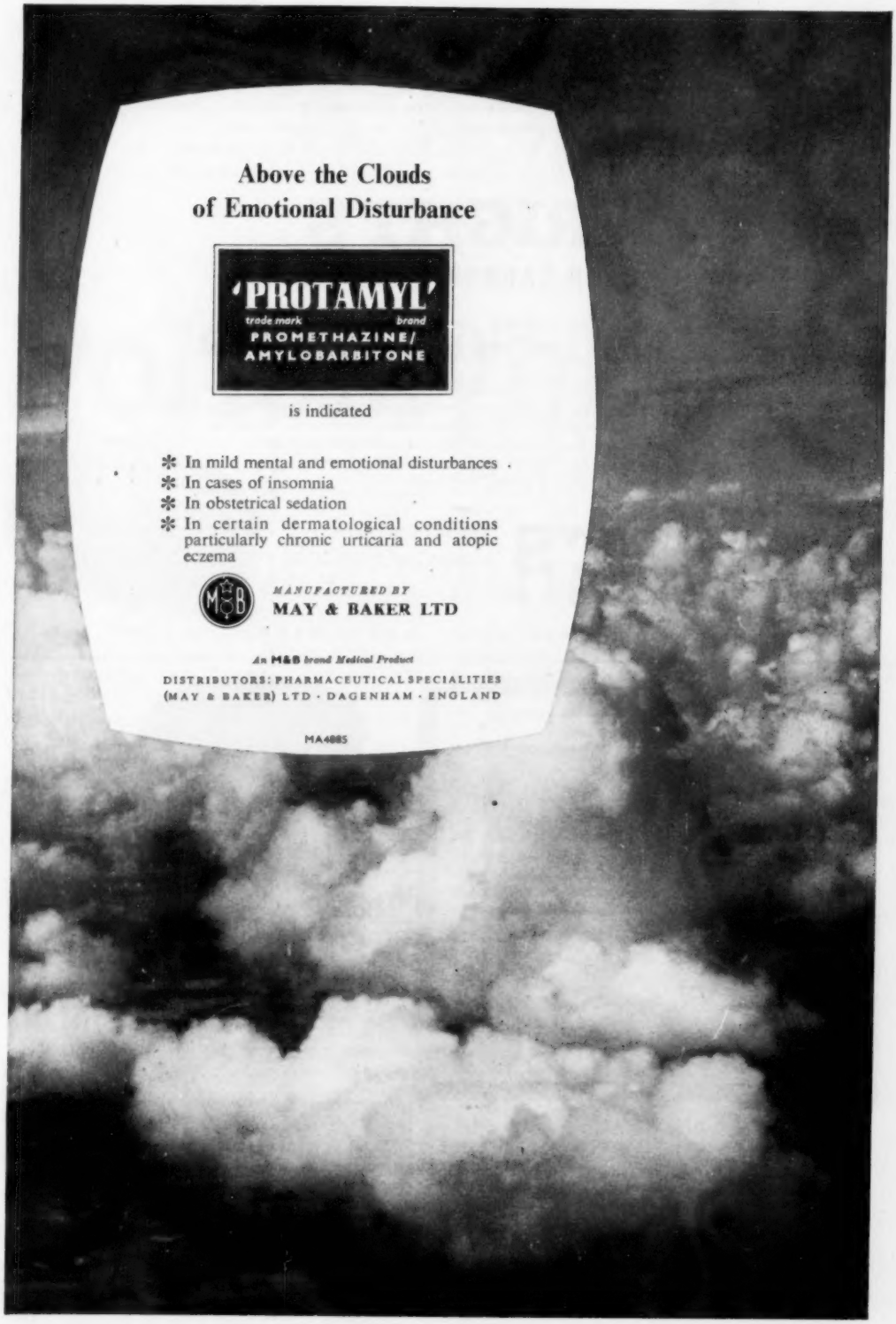
On Sunday, Sept. 7, at 10.15 A.M., at University College Hospital, London, W.C.1, Mr. G. L. Bunton will give a clinical demonstration for general practitioners on cases suitable for pædiatric surgery.

The Medical Electronics Center of the Rockefeller Institute has prepared a *Bibliography on Medical Electronics*, which has been published by the Professional Group on Medical Electronics, Institute of Radio Engineers, 1, East 79th Street, New York 21.

A pamphlet entitled Smallpox and Vaccination, which answers in simple language questions that may be asked by the lay public, has been issued by the Research Defence Society, 11, Chandos Street, Cavendish Square, London, W.1 (*6d.*, post free).

The St. Thomas's Hospital old students' dinner will be held at the Savoy Hotel, London, W.C.2, on Friday, Oct. 31, at 7.30 P.M. Prof. O. L. V. S. De Wesselow will be in the chair. Tickets (£2 2s.) may be had from the hon. secretaries at the medical school.

CORRIGENDUM: "*Calling Dr. Kildare.*"—In the article by Mr. H. C. Elliot and Dr. J. M. A. Lenihan (*Lancet*, 1958, i, 1329) the table should have shown under 'Selectacall' the nature of the signal as buzzer, and speech signal when receiver, with speech button pressed, is held to the ear.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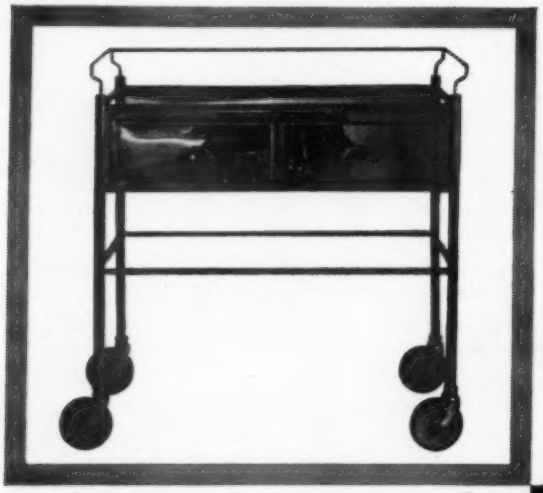

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(1) 'Topical Aspects of Poliomyelitis'; 'Journal of the Royal Society of Health' Dec. 1956.
(2) World Health Organisation Technical Report Series, No. 81, 'Expert Committee on Poliomyelitis'.
(3) Domestos Technical Report D.R. 82A.

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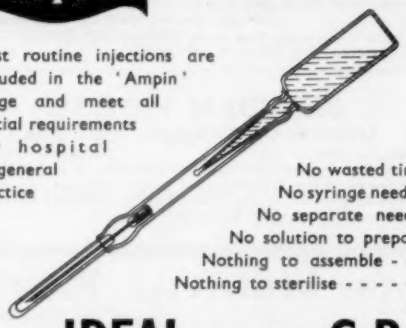

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Academic and Educational

UNIVERSITY OF LONDON

GRANTS FOR RESEARCH

Applications are invited from members of the University and teachers in Schools of the University for grants from the Central Research Fund to assist specific projects of research and for the provision of special materials and apparatus. Grants are not made for normal maintenance.

Applications must be received not later than 31st August, 1958. Forms of application and further particulars may be obtained from the Secretary to the Central Research Funds Committee, University of London, Senate House, London, W.C.1.

GUY'S HOSPITAL

DIPLOMA IN PHYSICAL MEDICINE—PART I

The next COURSE for this Diploma will begin on TUESDAY, 6TH JANUARY, 1959.

Full particulars from Physics Department, Guy's Hospital Medical School, London, S.E.1.

SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 8TH DECEMBER, 1958. The following Examination will be held in JULY, 1959.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

THE UNIVERSITY OF LIVERPOOL

A POSTGRADUATE COURSE on "Modern Trends in Paediatric Surgery," limited to 16 surgeons, will be held at Alder Hey Children's Hospital, Liverpool, 12, on 30TH–31ST OCTOBER and 1ST NOVEMBER, 1958, commencing at 9 A.M. each day.

30TH OCTOBER

Introduction	Professor C. A. WELLS
Hare Lip and Cleft Palate Surgery	Mr. R. P. OSBORNE
Congenital Malformations of the Central Nervous System	Mr. R. B. ZACHARY (Sheffield)
Urinary Incontinence in Childhood	Mr. P. P. RICKHAM

In the afternoon—Operations and Clinical Meetings.

31ST OCTOBER

Treatment of Hirschsprung's Disease	Miss ISABELLA FORSHALL
Treatment of Hiatus Hernia in Childhood	Mr. J. H. JOHNSTON
Cardiac Surgery in Childhood	Mr. RONALD EDWARDS

In the afternoon—Operations and "Brains Trust".

1ST NOVEMBER

Treatment of Œsophageal Atresia	Miss ISABELLA FORSHALL
Intestinal Obstruction in the Newborn	Mr. P. P. RICKHAM
Treatment of Imperforate Anus	Mr. DENIS BROWNE (London)

In the afternoon—Visit to wards and Neonatal Surgical Unit.

The Fee for the Course will be 5 guineas (excluding meals).

Applications should be sent to the Dean of the Faculty of Medicine, The University, Liverpool, 3.

THE UNIVERSITY OF LIVERPOOL

RADIOLOGY

The University of Liverpool provides a FULL-TIME COURSE of 2 academic years leading to a Diploma in Radiology which can be taken in either Radiodiagnosis or Radiotherapy (D.M.R.(D) Liverpool or D.M.R.(T.) Liverpool), and which is open to graduates of approved medical schools. The course (which begins in OCTOBER each year) allows a candidate to hold suitable hospital appointments during the second year, and covers the regulations required by the Conjoint Board. The fee for the full 2-year course is £63. The degree of M.Rad. may, after report by the Faculty, be conferred on holders of the D.M.R.(D.) or (T.) Liverpool, under certain conditions.

Applications for further information should be addressed to the Dean of the Faculty of Medicine.

STANLEY DUMBELL, Registrar.

UNIVERSITY OF MANCHESTER

A SHORT INTENSIVE COURSE in the Practice of Industrial Medicine will be held in the Department of Occupational Health, Manchester University, commencing MONDAY, 20TH OCTOBER, 1958, to SATURDAY, 25TH OCTOBER, 1958, inclusive. Numbers will be strictly limited. Registration fee £8.

Applications should be sent to the Secretary, Nuffield Department of Occupational Health, Clinical Sciences Building, York-place, Manchester, 13, from whom further particulars may be obtained.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE AND GUY'S HOSPITAL MEDICAL SCHOOL. Applications are invited for the appointment of SENIOR LECTURER IN PREVENTIVE AND SOCIAL MEDICINE. The D.P.H. or equivalent qualification is essential. The Lecturer's duties will include postgraduate teaching at the London School of Hygiene and Tropical Medicine, and undergraduate teaching at Guy's Hospital Medical School. Opportunities will be given for research. Duties will begin on 1st October, 1958, or as soon afterwards as possible. Salary will be on the scale £1650–£100–£1950, with possibility of further extension, plus family allowances. Superannuation under F.S.S.U. Commencing salary will be assessed according to qualifications and experience.

Applications should be submitted by letter to the Dean, London School of Hygiene and Tropical Medicine, Keppel-street, London, W.C.1, not later than 29th August, 1958.

NATIONAL INSTITUTE FOR RESEARCH IN DAIRYING (UNIVERSITY OF READING). Applications are invited for the post of HEAD of the Bacteriology Department in succession to Dr. A. T. R. Mattick, who will relinquish the post on 30th September, 1958.

Further particulars from the Secretary, National Institute for Research in Dairying, Shinfield, Reading. (Quote reference 58/23.)

ST. MARY'S HOSPITAL MEDICAL SCHOOL (University OF LONDON), Paddington, W.2. Applications are invited for the appointment of Full-time SENIOR LECTURER IN CLINICAL PATHOLOGY in the Paediatric Unit for a period of 3 years with possibility of renewal. Salary within the scale £1650–£100–£2500, together with superannuation under the F.S.S.U. (or N.H.S.) and children's allowance. The duties of the post will be paediatric clinical pathology at Paddington Green Children's Hospital, and opportunities for research will be available in the Medical School. The appointee may in due course be graded as a Consultant in Pathology.

Applications (3 copies), together with the names of 3 referees, should be sent before 8th September, 1958, to the Secretary, from whom further particulars should be obtained.

THE UNIVERSITY OF LEEDS. Department of Pathology. Applications are invited from candidates with a registered medical qualification for appointment as ASSISTANT LECTURER IN PATHOLOGY from 1st November or such other date as may be arranged. Salary on scale £900–£100–£1100 a year, according to age, qualifications and experience. The person appointed will be required to assist in the routine work of the Department of Pathology (which includes the haematology of the General Infirmary at Leeds) but will be expected also to take part in some research.

Applications (3 copies), stating date of birth, qualifications and experience, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 30th September, 1958.

UNIVERSITY OF DUBLIN. Trinity College. Applications are invited for the position of LECTURER IN PHARMACOLOGY. The position will offer opportunities for research, and the lecturer will be encouraged to develop his subject. The salary will be in the range £1425–£1900 with children's allowance of £25 per child, and the lecturer will be a member of a non-contributory insurance pension scheme (transferable).

Further information may be obtained from the Registrar, Trinity College, Dublin, who will accept applications (3 copies) until 15th September, 1958. Duties to be taken up on the earliest convenient date.

AUSTRALIA. UNIVERSITY OF SYDNEY. Lectureship/ SENIOR LECTURESHIP IN PATHOLOGY. Applications are invited for the above position. The salary for a Senior Lecturer is within the range £2200–£80–£2550 (Australian) p.a.; for a Lecturer within the range £1500–£90–£2100 (Australian) p.a. In each case cost-of-living adjustment will be allowed. The salary is subject to deductions under the State Superannuation Act. The commencing salary will be fixed according to the qualifications and experience of the successful applicant. Under the Staff Members' Housing Scheme, in cases approved by the University and its bankers, married men may be assisted by loans to purchase a house.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. Applications close, in Australia and London, on 31st October, 1958.

CANADA. ONTARIO. QUEEN'S UNIVERSITY. ASSISTANT or ASSOCIATE PROFESSOR OF PSYCHIATRY required. This position to be that of part-time consultant with a salary within the range of $7700–$10,200, according to experience and qualifications, and private consulting privileges. Candidates with and without special experience of child psychiatry are invited to apply.

Applications should be addressed to: R. BRUCE SLOANE, M.D., Department of Psychiatry, Queen's University, Kingston, Ont.

UNIVERSITY OF MALAYA, Singapore. Applications are invited for (*a*) LECTURESHIP or (*b*) ASSISTANT LECTURESHIP IN PATHOLOGY from candidates with registrable medical qualifications. Salary scales: (*a*) £1295–£49–£1442/£1540–£56–£1988 p.a.; (*b*) £1148–£49–£1246 p.a., entry point according to qualifications and experience. Allowances: expatriation in range £280–£308 p.a., cost-of-living in range £210–£560 p.a. Passages for appointee, wife, and children under 12 years. Part-furnished quarters at reasonable rent. Provident Fund scheme.

Detailed applications (6 copies), naming 3 referees, by 30th September, 1958, to Secretary, Inter-University Council for Higher Education Overseas, 29, Woburn-square, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF TORONTO. Connaught Medical Research Laboratories. Applications are invited to fill 2 positions as MEDICAL OFFICERS. Duties will include organisation and supervision of field tests of vaccines and related biological products. Experience in public-health, epidemiology, or biometrics is preferred. Starting salary range is $7000–$10,000 p.a.

Apply in writing to the Director, Connaught Medical Research Laboratories, University of Toronto, Toronto, 4, Canada, giving full details of qualifications, experience, age, and marital status.

Hospital Services: Senior Appointments

AMENDED ADVERTISEMENT

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.1. A Part-time CONSULTANT PLASTIC SURGEON is to be appointed to this Hospital, to commence duties on 1st October, 1958. This appointment is open to registered medical practitioners possessing a higher qualification in surgery.

Applications, which should be sent to the Secretary to the Board of Governors, will be accepted up to 1st September, 1958.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.1. Applications are invited from registered medical practitioners for the post of Part-time DIRECTOR of Diagnostic Radiology (Consultant grade). Applicants must hold the Diploma in Medical Radiology, and possession also of a higher qualification is desirable.

Applications, giving details of qualifications and experience, together with the names of 3 referees, should be sent to the Secretary to the Board of Governors not later than 6th September, 1958.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, London, W.C.1, and Golden-square, W.1. The Board of Governors invites applications for the post of ASSISTANT DIRECTOR of the Audiology Unit (Consultant grading) for attendance on at least 3 sessions weekly. Candidates must have had considerable clinical experience in otorhinolaryngology and especially in audiology.

Applications, which should give full details of age, qualifications, experience, and posts held, together with the names of 2 referees, should be sent in triplicate to the House Governor by 30th September, 1958.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANT PSYCHIATRIST (Psychotherapy), 5 half-days a week. Tavistock Clinic, 2-4, Beaumont-street, W.1. Post vacant early December, 1958.

Applications before 29th September, 1958.

(2) 2 ASSISTANT PSYCHIATRISTS, each 4 half-days a week, Senior Hospital Medical Officer grade, Portman Clinic, 3, Bourdon-street, Davies-street, W.1. Experience in Psychotherapy an advantage. Posts vacant February, 1959.

Applications before 1st October, 1958.

Clinics may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11a, Portland-place, W.1.

BIRMINGHAM ACCIDENT HOSPITAL. Whole-time Locum Tenens CONSULTANT ANÆSTHETIST. Vacant immediately for 6 months or possibly longer. Wide experience specialty essential.

Apply immediately, naming 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15.

AMENDED ADVERTISEMENT

LEEDS REGIONAL HOSPITAL BOARD. Consultant in Ophthalmology—Leeds and Otley (8 notional half-days per week). Duties at hospitals in Leeds A Group, outpatient facilities at the Leeds Public Dispensary and Hospital and inpatients at St. James's Hospital, Leeds. Duties include 1 session per week at Otley General Hospital, consultative work in connection with the School Eye Service and relief duties at hospitals in the Harrogate and Ripon group. The person appointed to reside in Leeds.

Applications (12 copies), stating age, qualifications, and details of present and previous appointments (with dates), and names and addresses of 3 referees, to the Secretary, Park Parade, Harrogate, by 16th September, 1958.

LEEDS REGIONAL HOSPITAL BOARD.

Whole-time SENIOR HOSPITAL MEDICAL OFFICER in Anæsthetics, Huddersfield Group. Person appointed to reside in Huddersfield.

Whole-time SENIOR HOSPITAL MEDICAL OFFICER in Pathology, Harrogate. Successful candidate to work under the general guidance of the Consultant in charge of the Department and to reside in Harrogate.

Applications (12 copies), stating age, qualifications and details of appointments held (showing dates), with names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 16th September, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS and THE LEEDS REGIONAL HOSPITAL BOARD. A CONSULTANT ANÆSTHETIST is required for part-time duties in Thoracic and General Surgical Anæsthesia—5 sessions per week at the General Infirmary at Leeds and 4 sessions per week in hospitals under the control of the Leeds Regional Hospital Board. Candidates must have had extensive experience in anæsthesia for thoracic surgery and must hold a higher qualification in anæsthetics.

Applications, stating age, nationality, qualifications, experience (with dates), and giving the names of 3 referees, to be sent to the undersigned by 30th August, 1958.

J. ARNOLD TUNSTALL,
Secretary to the Advisory Appointments Committee.
The General Infirmary, Leeds, 1.

LEEDS. THE UNITED LEEDS HOSPITALS and LEEDS REGIONAL HOSPITAL BOARD. Applications are invited for the post of CONSULTANT-IN-CHARGE of the Department of Venereology at the General Infirmary at Leeds and for duties at St. James's Hospital, Leeds. The successful candidate may also be appointed a Clinical Lecturer in Venereal Diseases at the University of Leeds. The appointment will be either part-time (9 sessions per week) or whole-time, and applicants should state their preference. Candidates must have had considerable experience in the treatment of venereal diseases. A higher qualification is desirable.

Applications, giving details of training and experience, and the names of 3 referees, should be sent to the undersigned by not later than 10th September, 1958.

J. ARNOLD TUNSTALL,
Secretary to the Joint Advisory Appointments Committee.
The General Infirmary, Leeds, 1.

OXFORD REGIONAL HOSPITAL BOARD. Locum RADIOLOGIST (Senior Registrar or Consultant), High Wycombe Area, whole-time or part-time over 4 sessions, for first 2 weeks in September.

Applications, stating qualifications, experience, and naming 2 referees, to Secretary, 43, Banbury-road, Oxford.

LIVERPOOL REGIONAL HOSPITAL BOARD. Sefton GENERAL HOSPITAL. Applications are invited for the post of Part-time CONSULTANT RADIOLOGIST giving 4 notional half-days at the above Hospital. The person appointed will be associated with the radiological work of the Regional Cardiac Centre which is situated at Sefton General Hospital. Candidates must possess a Diploma in Radiology and have wide experience in the specialty.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 55, Castle-street, Liverpool, 2, to be returned no later than 13th September, 1958.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL REGIONAL HOSPITAL BOARD. Chester AND DISTRICT AREA. Applications are invited for the post of Whole-time ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer). Duties, which will be under the supervision of the Consultant Chest Physician, will include work at chest clinics and hospitals providing beds for the treatment of patients suffering from general chest diseases and pulmonary tuberculosis, together with preventive and aftercare work for the local health authorities. Candidates should hold a higher qualification in medicine and have considerable experience in the diagnosis and treatment of chest diseases, including tuberculosis.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 55, Castle-street, Liverpool, 2, to be returned not later than 13th September, 1958.

VINCENT COLLINGE, Secretary to the Board.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PATHOLOGIST required. General Hospital, Nottingham. The successful candidate will work under the supervision of the Pathologist in Charge of the Department. Applicants should have general all-round experience in clinical pathology, but a special interest in hæmatology is desirable. A higher medical qualification will be an advantage. Salary scale £1653 15s.–£52 10s.–£2126 5s.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 20th September, 1958.

SOUTH WESTERN REGIONAL HOSPITAL BOARD. NORTH GLOUCESTERSHIRE CLINICAL AREA. Applications are invited for the appointment of a CONSULTANT GERIATRICIAN in the North Gloucestershire Clinical Area. The appointment will be on a maximum part-time (9 sessions) basis. The successful candidate, who will have charge of beds at the Gloucestershire Royal Hospital, Gloucester (Great Western Road Unit), will be required to organise and take charge of a geriatric service for the clinical area and to visit other hospitals in the area as determined by the regional board.

Applications (12 copies), stating date of birth, qualifications, and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 13th September, 1958.

SOUTH WESTERN REGIONAL HOSPITAL BOARD. WEST CORNWALL CLINICAL AREA. Applications are invited for the appointment of a Whole-time CONSULTANT PSYCHIATRIST to the West Cornwall Clinical Area. Applicants must possess a higher qualification. The successful candidate will work mainly at St. Lawrence's Hospital, Bodmin; in addition he will be required to visit other hospitals in the clinical area as determined by the regional board from time to time. Residential accommodation is available for a married man.

Applications (12 copies), stating date of birth, qualifications, and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 13th September, 1958.

NORTHERN IRELAND HOSPITALS AUTHORITY. The Authority invite applications for the post of DEPUTY ADMINISTRATIVE MEDICAL OFFICER. Applicants must have had at least 7 years' experience since registration, including experience in the administration of hospital services. The salary for the post will be at the rate of £1892 p.a., rising by 4 annual increments of £84 and 1 increment of £54 to a maximum of £2282 p.a.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44/46, Queen-street, Belfast, and to be returned not later than 13th September, 1958.

AUSTRALIA. THE ROYAL MELBOURNE HOSPITAL. Applications are invited for the post of Full-time MEDICAL OFFICER to the Cardiac Clinic at The Royal Melbourne Hospital. The appointment is for 1 year in the first instance, and is renewable. Applicants must hold a senior degree in medicine. They are required to give details of their training in general medicine, and of training in special methods of investigation of cardiac and pulmonary functions, as well as in cardiology. The salary is £2000 p.a.

Applications, on the prescribed form, close with the undersigned on 1st October, 1958. Further information may be obtained on application. AFTON MORCOM, Manager.

NEW ZEALAND. WAIKATO HOSPITAL, Hamilton, NEW ZEALAND. Applications are invited from suitably qualified medical practitioners of the British Empire for the position of Full-time ORTHOPÆDIC SURGEON at the above Hospital. Preference will be given to applicants possessing postgraduate degrees. Salary in accordance with the Hospital Employment (Medical Officers) Regulations as either:

(*a*) Senior Registrar £N.Z.1010–£N.Z.1170 plus allowance of £N.Z.200 in lieu of residence, or

(*b*) Junior Specialist £N.Z.1640–£N.Z.1940 (non-resident).

An allowance will be paid on arrival, towards travelling expenses incurred, in travelling to take up appointment.

Conditions of appointment and form of application are available from the Office of the High Commissioner for New Zealand, 415, The Strand, London, W.C.2. Applications close with the Acting Secretary, Waikato Hospital Board, P.O. Box 934, Hamilton, New Zealand, on Thursday, 30th October, 1958.

Hospital Services: Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications invited for post of MEDICAL REGISTRAR (whole-time). Salary within the Registrar grade. The appointment is for 1 year, with eligibility for reappointment. Candidates must hold the M.R.C.P. Diploma or the M.B. of a University.

Applications, stating age, qualifications (with dates), nationality and appointments held, together with copies of testimonials, by 6th September, 1958, to KENNETH A. F. MILES, House Governor.

BROMPTON HOSPITAL, S.W.3. Applications invited for the following posts:—

RESIDENT SURGICAL OFFICER (post graded as Senior House Officer or Registrar, according to qualifications and experience) for 6 months from 1st November, 1958, with eligibility for reappointment. Candidates must have held a resident hospital appointment.

RESIDENT HOUSE PHYSICIAN (3 vacancies). 2 vacancies for 6 months from 1st November, 1958. Duties include work in Outpatient Department and Wards. One of the successful candidates will also be required to undertake duties in E.N.T. Department. One vacancy for 9 months from 1st November, 1958. The first 3 months at Brompton Hospital Sanatorium, Frimley, and the following 6 months at the hospital in London covering work in Outpatient Department and Wards. Salary at the rate of £577 10s. p.a.

Applications, stating age, qualifications (with dates), nationality, and appointments held, together with copies of testimonials, by 6th September, 1958, to KENNETH A. F. MILES, House Governor.

BOW GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens HOUSE SURGEON required at Poplar Hospital, East India Dock-road, London, E.14, for the period 13th September to 11th October, 1958, inclusive.

Apply Hospital Secretary. (Telephone: EASt 1876.)

COPPETTS WOOD HOSPITAL, Muswell Hill, N.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Infectious Diseases required at above Hospital. A good knowledge of general medicine is required, but experience in infectious diseases is not essential. Resident. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Northern Group Hospital Management Committee, Royal Northern Hospital, N.7, by 3rd September, 1958.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. HOUSE SURGEON (pre-registration) required immediately.

Applications, stating age, nationality, qualifications and experience, with names of 2 referees, to be sent to the Secretary.

EASTERN HOSPITAL, London, E.9. Applications for the resident post, vacant 29th September, 1958, of SENIOR HOUSE OFFICER should be sent to the Group Secretary, Hackney Hospital, E.9, by 8th September, 1958, quoting EH/SHO. The post, which offers good opportunities for postgraduate study, is for 1 year in first instance. Duties may include some work in Chest United and E.N.T. Department.

GERMAN HOSPITAL, London, E.8. (General, 157 Beds.) Applications for the resident appointment, now vacant, of SENIOR HOUSE OFFICER (general surgery) (recognised for F.R.C.S.) should be sent to Group Secretary, Hackney Hospital, E.9, by 1st September, 1958. (Quoting GH/SHO.)

GUY'S-MAUDSLEY NEUROSURGICAL UNIT. Applications are invited for the resident post of SENIOR HOUSE OFFICER for 6 months commencing on 1st October, 1958. The Unit, which is housed in the Maudsley Hospital, serves both Guy's Hospital, and the Bethlem Royal Hospital, and the Maudsley Hospital.

Applications should be made by 1st September, 1958, to K. J. JOHNSON, House Governor and Secretary, Maudsley Hospital, Denmark Hill, S.E.5.

HACKNEY HOSPITAL, London, E.9. (857 Beds.) Applications from registered practitioners for appointment to the 6-month resident post of HOUSE SURGEON, with duties in E.N.T., Plastic Surgery, Orthopædic, Skin, and Casualty Departments, should reach Secretary, above address, by 1st September, 1958, quoting HH/CO.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL. Ducane-road, London, W.12. RESIDENT HOUSE PHYSICIAN (pædiatrics) required 1st November, 1958. Post recognised for D.C.H.

Applications, on forms obtainable from the Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospital, Ducane-road, London, W.12, by 6th September, 1958.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL. Ducane-road, London, W.12. 5 RESIDENT HOUSE PHYSICIANS (general medicine) required 1st November, 1958. 2 of these posts will give experience in neurology and rheumatism.

Detailed applications, copies of 2 recent testimonials, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, W.12, by 6th September, 1958.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. RESIDENT HOUSE SURGEON (orthopædics) required 8th October, 1958.

Detailed applications, copies 2 recent testimonials, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, by 30th August, 1958.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time, NON-RESIDENT REGISTRAR (pædiatrics) required as soon as possible. Candidates should possess membership of 1 of the Royal Colleges of Physicians.

Detailed applications, names of 2 referees, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, by 1st September, 1958.

HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered medical practitioners for the post of RESIDENT CASUALTY OFFICER (graded as Senior House Officer). Salary £819 10s. p.a. Vacant 1st October, 1958, tenable for a period of 6 months at the Main Outpatient Department, Bayham-street, N.W.1.

Application forms may be obtained from the Secretary, to whom they should be returned, together with copies of 3 recent testimonials, by 8th September, 1958.

HAMPSTEAD GENERAL HOSPITAL, The Green, Haverstock Hill, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered medical practitioners for the post of Locum RESIDENT CASUALTY OFFICER (graded as Senior House Officer) for a period of 4 months from 1st September to 31st December, 1958, at the Main Outpatient Department, Bayham-street, N.W.1.

Application forms may be obtained from the Secretary.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE SURGEON (Senior House Officer grade) required. Duties mainly orthopædic, some E.N.T. and emergency general surgery. New operating-theatre. Outpatient and Casualty Department.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

KING'S COLLEGE HOSPITAL, Denmark Hill, S.E.5. Applications are invited for the appointment of SENIOR REGISTRAR in Otorhinolaryngology. Applicants must hold the qualification of F.R.C.S. The appointment, which is subject to the terms and conditions of service of medical and dental staff, will be for 1 year in the first instance.

Applications, quoting age, education, qualifications and experience, and giving the names of 2 referees, should be sent to the undersigned by 6th September, 1958.

S. W. BARNES, House Governor.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Locum SURGICAL REGISTRAR required for general surgery, orthopædics and E.N.T. work from 23rd September to 23rd October, 1958, in the first instance.

Apply in writing to the Secretary.

LAMBETH HOSPITAL, Brook-drive, S.E.11. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of SURGICAL REGISTRAR. The appointment is normally for 2 years, but is subject to review at the end of 1 year. It is recognised for the F.R.C.S. Duties comprise general surgery, orthopædics and E.N.T. The post is resident or non-resident, but if the latter the successful applicant will be required to sleep in on nights on duty.

Forms of application obtainable from the Group Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, by 6th September, 1958.

LONDON CHEST HOSPITAL, E.2. Hospitals for Diseases OF THE CHEST. A vacancy occurs 1st October, 1958, for SURGICAL REGISTRAR. The appointment is for 1 year in the first instance and is non-resident. Previous experience in thoracic surgery essential.

Applications, stating date of birth, qualifications (with dates), and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 3rd September, 1958.

J. ROBBINS, House Governor.

London Chest Hospital, E.2.

MARIE CURIE HOSPITAL, 66, Fitzjohn's-avenue, Hampstead, N.W.3. HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (House Officer grade) required.

Applications, with copies of testimonials, to the Administrative Officer.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. HOUSE SURGEON. Vacant early September, 1958. Recognised for F.R.C.S. and approved for pre-registration service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE SURGEON (post recognised for F.R.C.S.) vacant now. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

MOORFIELDS EYE HOSPITAL (High Holborn Branch), London, W.C.1. Applications are invited from Male practitioners for the post of NON-RESIDENT CASUALTY OFFICER (Registrar grade). The successful candidate will be required to take up his duties on 1st December, 1958. If recommended by the Medical Committee, he will be eligible for appointment from 1st June, 1959, to the posts of Third, Second, and First Resident Surgical Officer (Registrar grade) consecutively for a period of 6 months in each case, making a total period of service of 2 years. Experience in ophthalmology is essential.

Forms of application are obtainable from the undersigned, to whom they should be returned, with not more than 3 testimonials, by 13th September, 1958.

G. DE B. PLEYDELL, Deputy House Governor.

NEW END HOSPITAL, Hampstead, N.W.3. Medical REGISTRAR (endocrinology) required. Vacant 1st October, 1958. General hospital of 220 Beds with a special department for endocrinology (27 Beds). Hospital may be visited by direct appointment with Surgeon-Superintendent.

Application forms obtainable from, and returnable to Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley Park, London, N.6 (ARC. 3070: Exts. 526/7), by 1st September, 1958.

NORTH MIDDLESEX HOSPITAL, London, N.18. House PHYSICIAN, post-registration, resident, required for 1st October, 1958, for 6 months. General medicine.

Applications (in own handwriting), stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 28th August, 1958.

NORTH MIDDLESEX HOSPITAL, London, N.18. SENIOR HOUSE OFFICER in Surgery, resident, required, for 1st October, 1958. 6 months' appointment in the first instance, with possible extension to 1 year. General surgery, trauma and orthopædics. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications (Primary Fellowship desirable), experience, with copies of recent testimonials and/or names of 2 referees, to Secretary of Hospital by 28th August, 1958.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

Mile End Hospital, E.1

SURGICAL REGISTRAR. Resident or non-resident. Recognised for F.R.C.S.

Whipps Cross Hospital, E.11

SURGICAL REGISTRARS (2 posts). Non-resident. Recognised for F.R.C.S.

Oldchurch Hospital, Romford, Essex

NEUROSURGICAL REGISTRAR. Resident or non-resident. Busy department offering excellent opportunities for training and experience. Recognised for F.R.C.S.

Rush Green Hospital, Romford, Essex

MEDICAL REGISTRAR. Resident or non-resident.

St. John's and Chelmsford and Essex Hospitals, Chelmsford

REGISTRAR in General Medicine and Pædiatrics. Resident. To work in Group Pædiatric, Premature Baby and Neonatal Departments and in General Medical wards of the hospitals.

Queen Elizabeth Hospital for Children, E.1, and Banstead, Surrey

PÆDIATRIC REGISTRAR. Non-resident. Experience in diseases of children essential.

St. Andrew's Hospital, Billericay, Essex

REGISTRAR in Pathology. Resident or non-resident.

Forest Group of Hospitals, E.17

REGISTRAR in Pathology. Non-resident. Hæmatology and biochemistry experience desirable.

Appointments subject to review after 1 year.

Application forms from Secretary, 11a, Portland-place, W.1, to be returned by 6th September, 1958.

PLAISTOW HOSPITAL, Samson-street, E.13. (211 Beds.) Applications are invited for the appointment of RESIDENT HOUSE OFFICER (post-registration or pre-registration second post) for 6 months commencing 1st October, 1958, in the Chest Unit and Infectious Diseases Unit (if possible, appointment to be preceded by 2 weeks' Locum); some experience in diseases of the chest desirable. The position offers good opportunity for experience in general medicine.

Applications, with copies of recent testimonials, to Hospital Secretary by 3rd September, 1958.

POPLAR HOSPITAL, East India Dock-road, London, E.14. SENIOR HOUSE OFFICER. Duties are mainly in connection with the Receiving Room and Casualty Departments. Post recognised for F.R.C.S. examination.

Applications, giving full details, to Group Secretary, 2A, Bow-road, E.3.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. SENIOR CASUALTY OFFICER (Male or Female, Senior House Officer grade) for 1 year commencing 19th September, 1958. Post recognised for F.R.C.S. (i.e., half the year is recognised as casualty and half as general surgery).

Applications, with names of 2 referees, to Hospital Secretary by 6th September, 1958.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.1. Applications are invited from registered medical practitioners for the post of SENIOR CASUALTY OFFICER. The appointment is full-time, resident, for 6 months, duties to commence on 1st October, 1958. Salary and conditions of service in accordance with those laid down by the Ministry of Health for Senior House Officers.

Application forms may be obtained from the Secretary to the Board of Governors, to whom they should be returned not later than 30th August, 1958.

ROYAL MARSDEN HOSPITAL, Fulham-road, S.W.3. Applications are invited from registered medical practitioners for post of HOUSE SURGEON (resident) for 6 months from 2nd October, 1958. Salary £577 10s. p.a.

Applications to be sent in on a form obtainable from the House Governor by 29th August, 1958.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, Brockley Hill, STANMORE, MIDDLESEX. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER for a period of 6 months. Duties to commence 5th October, 1958.

Applications to be received by 3rd September, 1958. Forms of application can be obtained from the House Governor, at 234, Great Portland-street, London, W.1.

ST. ANDREW'S HOSPITAL, Bow, E.3. House Physician required. Recognised pre-registration post.

Applications, with copy of at least 1 testimonial, to the Hospital Secretary.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT HOUSE SURGEON (third post), now vacant, at above Hospital, for a period of 6 months.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned immediately.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD, WANDSWORTH HOSPITAL GROUP. E.N.T. REGISTRAR (resident) required. Post vacant 1st October, 1958.

Application forms, obtainable from Group Secretary at above address, to be completed and returned by 6th September, 1958.

ST. MARY'S HOSPITAL, W.2. Anæsthetic Registrar (whole-time) for first period of 12 months from 1st October, 1958. Candidates should possess the D.A.

Applications, with names and addresses of 3 referees, must reach the House Governor not later than 1st September, 1958.

ST. NICHOLAS HOSPITAL, Tewson-road, Plumstead, S.E.18. SENIOR HOUSE OFFICER (anæsthetics). The post provides good experience and is recognised for F.F.A. R.C.S. and D.A. 6 months' resident appointment and may then be renewed.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House SURGEON. 6-month appointment. Approved for pre-registration service and recognised for F.R.C.S.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. Senior HOUSE OFFICER (Casualty Department). Vacant early September. Recognised for F.R.C.S. There are 2 Senior House Officers in the department, which provides good general experience. 6 months' resident appointment, and may then be renewed.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. OLAVE'S HOSPITAL, Lower-road, Rotherhithe, S.E.16. SENIOR HOUSE OFFICER required from 13th September, 1958, for general surgery and orthopædics (mainly orthopædics).

Apply to Hospital Secretary by 31st August, 1958.

ST. STEPHEN'S HOSPITAL, S.W.10. Pædiatric House PHYSICIAN (with dermatology duties). Resident. Immediate vacancy. Not recognised for D.C.H.

Applications, naming 2 referees, to Medical Superintendent within 7 days.

ST. STEPHEN'S HOSPITAL, S.W.10. Senior House PHYSICIAN (Senior House Officer) (general medicine). Some teaching. Vacancy mid-September, 1958.

Applications, naming 2 referees, to Medical Superintendent.

SOUTH EAST REGIONAL THORACIC SURGERY UNIT. (50 Beds.) BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER. Recognised for F.R.C.S. 6-month appointment and may then be renewed for a further period. The work includes surgery for cardiac, œsophageal and tuberculous and non-tuberculous conditions.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. CLINICAL PATHOLOGIST (Senior House Officer grade). Applications are invited from registered Women medical practitioners for the post of Senior House Officer in Pathology. Vacant 10th September, 1958. Previous experience in laboratory work not essential.

Form of application from the Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy in October, 1958, for a JUNIOR ANÆSTHETIC REGISTRAR (Senior House Officer grade).

Further particulars and form of application, which must be returned by 8th September, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy in October, 1958, for a DENTAL HOUSE SURGEON (Senior House Officer grade). The post is recognised for the Fellowship in Dental Surgery, Royal College of Surgeons. Experience is given in oral surgery and orthodontics.

Further particulars and form of application, which must be returned by 8th September, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy in October, 1958, for a Whole-time ASSISTANT MEDICAL REGISTRAR (Registrar grade) with some duties in the Department of Physical Medicine and the Tuberculosis Diagnostic Clinic.

Further particulars and form of application, which must be returned by 8th September, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies on 15th November, 1958, for the following Senior House Officers :—

1 HOUSE PHYSICIAN.

1 HOUSE SURGEON to the Orthopædic and Plastic Departments.

Further particulars and form of application, which must be returned by 8th September, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 1st November, 1958, for a Whole-time SENIOR REGISTRAR to the E.N.T. Department.

Further particulars and form of application, which must be returned by 8th September, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 1st November, 1958, for a Whole-time REGISTRAR to the Department of Physical Medicine.

Further particulars and form of application, which must be returned by 8th September, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy in October, 1958, for a Whole-time SURGICAL REGISTRAR (Senior Registrar grade).

Further particulars and form of application, which must be returned by 8th September, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1. Applications invited for post of REGISTRAR in Anæsthetics for 1 year in first instance from 1st November, 1958.

Applications (9 copies), with names of 2 referees, to House Governor by 6th September.

THORPE COOMBE MATERNITY HOSPITAL, Walthamstow, E.17. (58 Beds.) Applications are invited from medical Women for the post of JUNIOR OBSTETRIC OFFICER (graded House Officer) vacant 23rd September, 1958. The Hospital is recognised by the Royal College of Obstetricians and Gynæcologists.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for the post of CASUALTY OFFICER (recognised for F.R.C.S.). Graded Senior House Officer. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, London, E.11. (191 Beds.) HOUSE SURGEON required. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (graded Senior House Officer), vacant 12th September, 1958. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c. Recognised for the F.F.A. R.C.S. and D.A.

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited from fully registered medical practitioners for the post of HOUSE OFFICER in the Geriatric Unit at above Hospital. This post, which is vacant now, offers excellent scope for persons interested in this specialty, as the most modern methods of geriatric treatment are employed.

Application forms, obtainable from the Hospital Secretary, to be returned by 1st September, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of HOUSE PHYSICIAN (post- or pre-registration), General Medicine, at above Hospital. This post becomes vacant on 13th September, 1958.

Application forms are obtainable from the Hospital Secretary, to whom they should be returned by 1st September, 1958.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the following appointments :—

* HOUSE PHYSICIAN (general medicine) 5 posts, recognised for M.D.(Lond.).
* HOUSE PHYSICIAN (geriatric).
† HOUSE SURGEON (general surgery). 2 posts, recognised for F.R.C.S.(Eng.).
* HOUSE SURGEON (obstetric). 2 posts, recognised for M.R.C.O.G. in obstetrics.

All posts vacant 1st October, 1958.

* Pre-registration candidates who have already held a first appointment may apply.
† Pre-registration candidates may apply.

Application forms obtainable from the Group Secretary, 46, Cholmeley Park, N.6 (ARC. 3070: Ext. 527), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 1st September, 1958.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, London, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT SURGICAL REGISTRAR required, 6th October, 1958.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, Park Royal, N.W.10, by 23rd September, 1958.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pathology). Vacant 1st October. The appointment is to the Group laboratories and is for 1 year. Salary £819 10s. p.a., less £150 p.a. if resident.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOSPITAL. MID-WALES HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (surgical) required (resident). Post recognised for F.R.C.S. examination. Vacancy immediate.

Applications, stating age, experience, &c., to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cardiganshire.

ALTON, HAMPSHIRE. LORD MAYOR TRELOAR ORTHOPÆDIC HOSPITAL. Locum ORTHOPÆDIC REGISTRAR required for 3 months from the middle of September, 1958. Post provides experience in non-pulmonary tuberculosis and general orthopædics and includes attendances at peripheral clinics. Residence available.

Apply as soon as possible, with names of 2 referees, to The Secretary, Lord Mayor Treloar Orthopædic Hospital, Alton, Hants.

AYLESBURY, BUCKINGHAMSHIRE. ROYAL BUCKINGHAMSHIRE HOSPITAL. OPHTHALMIC HOUSE OFFICER. Post recognised for D.O. Vacant now.

Apply, with copies of 2 recent testimonials, to Secretary-Superintendent.

AYLESBURY (near). ST. JOHN'S HOSPITAL (Psychiatric—805 Beds), STONE, near AYLESBURY. ST. JOHN'S AND MANOR HOUSE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a post of JUNIOR HOSPITAL MEDICAL OFFICER (single accommodation available), in accordance with the terms and conditions of service of the National Health Service. A charge of £170 for board, lodging, and laundry will be made if resident. The appointment will be for 1 year in the first place.

Applications, stating age, qualifications and experience, together with names of 3 referees, to the Physician-Superintendent.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE HOSPITAL. Plastic Surgery and Jaw Injuries Unit (Nuffield Burns Unit). Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER in this department of the Hospital. Duties will include care of patients in the Burns Unit (under supervision) and also work on general plastic wards and the theatre.

Applications, with names of 2 referees, to the Administrative Officer by 27th August, 1958. Interviews 3rd September, 1958.

ASHFORD HOSPITAL, Ashford, Middlesex. North West METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital (560 Beds, with all the usual special departments) for general anæsthetic duties at Ashford and such other hospitals within the group as may be necessary. Post recognised for D.A. and F.F.A. R.C.S. Vacant 7th September, 1958. Hospital may be visited by direct appointment with the Medical Director.

Application forms obtainable from, and returnable to, the Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 2nd September, 1958.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE.

SENIOR HOUSE OFFICER (general surgery) required at Ashton-under-Lyne General Hospital. Recognised under F.R.C.S. regulations. Vacant September.

HOUSE OFFICER (general surgery) also required.

Applications, with copies of 2 testimonials, to Group Secretary, Ashton-under-Lyne General Hospital, Ashton-under-Lyne, Lancs.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration); vacant now. The Hospital serves a wide area of pleasant countryside, and the post affords good opportunity to study excellent clinical material.

Apply to Group Secretary, 19, Alexandra-road, Barnstaple, N. Devon.

BARNSTAPLE. NORTH DEVON INFIRMARY. (Central Group Hospital of 105 Beds.) SENIOR HOUSE SURGEON post vacant immediately for 1 year. Salary £819 10s. p.a. 5-roomed furnished flat available for rental.

Applications, with customary details, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE PHYSICIAN (pre-registration) required from 5th September, 1958.

Applications, naming 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BARRY ACCIDENT AND SURGICAL HOSPITAL. SENIOR HOUSE OFFICER required. House available to rent.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

BEBINGTON, WIRRAL, CHESHIRE. CLATTERBRIDGE HOSPITAL. CENTRAL WIRRAL GROUP. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (casualty/orthopædics), resident or locum. Salary in accordance with current terms and conditions of service, i.e., £852 10s.–£55–£1182 10s. p.a., less £170 p.a. for residential facilities.

Application forms, obtainable from the Secretary, should be returned within 10 days of the appearance of this advertisement.

BEBINGTON, WIRRAL, CHESHIRE. CLATTERBRIDGE HOSPITAL. CENTRAL WIRRAL GROUP. Locum SENIOR HOUSE OFFICER (anæsthetics) required to fill vacancy until 30th September, 1958. Salary in accordance with current terms and conditions of service.

Application forms, obtainable from Secretary, to be returned within 7 days of the appearance of this advertisement.

BEDFORD GENERAL HOSPITAL. (431 Beds.) Orthopædic HOUSE SURGEON required. Vacant 31st August, 1958. Pre- or post-registration ; recognised for F.R.C.S. Post offers wide experience in a busy specialist orthopædic and traumatic unit.

Inquiries and applications, with copies of 2 recent testimonials, to be sent immediately to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. BROADGATE HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER. Accommodation for married man available. Opportunity given for study and attendance at courses in Leeds.

Applications, giving details of present appointment, experience, and names of referees, to Physician-Superintendent.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.) ORTHOPÆDIC HOUSE SURGEON with some general surgery (House Officer or Senior House Officer grading according to experience). Vacant now. Approved pre-registration post. Fully registered practitioners may apply. Recognised for F.R.C.S. Married quarters may be available.

Apply Group Secretary.

BIRMINGHAM. ST. MARGARET'S HOSPITAL, Great BARR, BIRMINGHAM, 22a. (Mental Deficiency—1491 Beds.) RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER. Accommodation for single person only.

Applications, stating age, qualifications and experience, together with names and addresses of 3 referees, should be forwarded to the Medical Superintendent not later than 30th August, 1958.

BIRMINGHAM (near). MIDLAND CENTRE FOR NEUROSURGERY, Holly Lane, SMETHWICK, near BIRMINGHAM. RESIDENT SENIOR HOUSE OFFICER. Vacant end of August, 1958. (Recognised for period of 6 months' unspecified training under R.C.S. regulations.) This is a new hospital entirely devoted to neurology and neurosurgery, within easy reach of Birmingham. Salary on national scale, less deduction for board, lodging, &c.

Applications, with names of 2 referees, to the Group Secretary, West Bromwich and District Hospitals Management Committee.

BIRMINGHAM. DUDLEY ROAD HOSPITAL. Whole-time Locum Tenens SENIOR REGISTRAR in Obstetrics and Gynæcology. Vacant 15th September, 1958. Higher qualification essential. Must be resident. Commonwealth candidates considered. Salary £26 8s. weekly, less emoluments.

Apply immediately to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15.

BIRMINGHAM. MOSELEY HALL HOSPITAL FOR CHILDREN, Alcester-road, BIRMINGHAM, 13. (65 Beds.) SENIOR HOUSE OFFICER (pædiatric). Vacant October, 1958. Resident or non-resident. Recognised for D.C.H.

Apply, with 3 testimonials, by 6th September, 1958, to Secretary, Birmingham (Selly Oak) Hospital Management Committee, Oak Tree-lane, Birmingham, 29.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Birmingham (Dudley Road) Group, Dudley Road Hospital, Birmingham, 18**

REGISTRAR (Ophthalmologist), Birmingham and Midland Eye Hospital, Church-street, Birmingham, 3. Research Department. Preferably with experience in physiology and clinical research, although this is not essential. Opportunity to work for higher degree.

(2) **Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29**

REGISTRAR (orthopædics), Royal Orthopædic Hospital, Birmingham. F.R.C.S. or Primary, and experience in orthopædic surgery desirable. Scheme of interchange, at Registrar level, with the General Hospital, Birmingham (Casualty Department), agreed between Regional Hospital Board and United Birmingham Hospitals; successful candidate may be required to spend not more than 1 year in such interchange.

(3) **Coventry No. 20 Group, Coventry and Warwickshire Hospital, Coventry**

REGISTRAR (general medicine), Gulson Hospital, Coventry (312 Beds). Duties mainly at Gulson Hospital. Vacant 1st October, 1958. Experience in specialty essential. Higher qualifications desirable. Resident.

(4) **West Bromwich Group, West Bromwich and District General Hospital, Edward-street, West Bromwich**

Whole-time Locum Tenens REGISTRAR (anæsthetics). Duties at West Bromwich and District General Hospital, Hallam Hospital, West Bromwich, and the Midland Centre for Neurosurgery, Smethwick. Resident. Salary £19 5s. per week, less emoluments. Vacant 15th September–15th December, 1958, inclusive. Apply immediately for this post, giving details of previous experience, qualifications, and naming 3 referees.

Application forms from Group Secretaries, to be returned by 1st September, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time SENIOR REGISTRAR in Psychiatry, South Warwickshire Group of hospitals; duties at Central Mental Hospital, near Warwick (1385 Beds), including Neurosis Unit, E.E.G. Department, and clinics for adults and children. House or flat available for married or single applicant. D.P.M. essential. Successful candidate may subsequently be required to spend not more than 2 years in a selected hospital of the United Birmingham Hospitals in accordance with the arrangements for the interchange of Registrars agreed between the two Boards.

Application forms from Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned by 8th September, 1958.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. RESIDENT MEDICAL OFFICER (Senior House Officer). General Hospital with 5 other resident medical officers.

Apply Medical Superintendent.

BIRMINGHAM. ST. CHAD'S HOSPITAL, Hagley-road, BIRMINGHAM, 16. HOUSE SURGEON required. Recognised for pre-registration.

Detailed applications, with copies of testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of REGISTRAR in Radiotherapy (non-resident Registrar grade) for duties in the Radiotherapy Departments of the United Birmingham Hospitals. Candidates should, if possible, hold additional qualifications in medicine, surgery, gynæcology, or physics, or a Diploma in Radiotherapy.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned by 6th September, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) at the Queen Elizabeth Hospital, Birmingham. There are 3 residents attached to the Department of Clinical Pathology. In addition to affording general experience in hæmatology, bacteriology, and some biochemistry, the appointment can provide opportunities for those studying for higher qualifications in medicine. The appointment is tenable for 1 year.

Application forms should be obtained from the Secretary to the Board of Governors, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him by 30th August, 1958.

BLACKPOOL. VICTORIA HOSPITAL. (354 Beds.) HOUSE OFFICER (orthopædic and traumatic surgery). Resident pre-registration post recognised for F.R.C.S., available in the main acute General Hospital serving the Blackpool and Fylde area.

Applications, stating age, experience (if any), and giving the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BLACKPOOL VICTORIA HOSPITAL. (354 Beds.) HOUSE PHYSICIAN. Resident pre-registration post vacant November, 1958.

Applications, stating age, experience (if any), and giving the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BISHOP'S STORTFORD, HERTFORDSHIRE. HERTS AND ESSEX GENERAL HOSPITAL. Applications invited for post of HOUSE OFFICER (surgical—pre-registration). Salary £467 10s.–£522 10s. p.a. less £125 for residential emoluments. Appointment to commence immediately.

Applications, stating age, nationality, qualifications and experience, with copies of 2 testimonials or names of referees, to Hospital Secretary.

BISHOP'S STORTFORD, HERTFORDSHIRE. HERTS AND ESSEX GENERAL HOSPITAL. Applications are invited for the post of HOUSE OFFICER (medical—pre-registration). Salary £467 10s.–£522 10s. p.a., less £125 in respect of residential emoluments. Appointment to commence 10th September, 1958.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, or names of referees, to Hospital Secretary.

BLACKBURN. ROYAL INFIRMARY. (262 general Beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (casualty and orthopædics) required 11th September, 1958. Recognised for F.R.C.S.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN. ROYAL INFIRMARY and QUEEN'S PARK HOSPITAL. BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER for E.N.T. Department, 32 Beds, 2 Consultants in specialty. Recognised for D.L.O. and F.R.C.S.

Apply to Group Secretary, Hospital Management Committee, Royal Infirmary, Blackburn.

BOGNOR WAR MEMORIAL HOSPITAL. (32 Beds.) RESIDENT SENIOR HOUSE OFFICER required to work under visiting Consultant Surgeon and Physician, also casualty work. Salary £819 10s., less £150 p.a. for residence. Modern fully equipped theatre. Good liaison with Chichester main hospitals and with local general practitioners. Also gives opportunity for postgraduate reading.

Apply, giving 3 referees' names, to Group Secretary, 174, Broyle-road, Chichester, Sussex.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Bolton District General Hospital (607 Beds)

RESIDENT SENIOR HOUSE OFFICER for general surgical duties. Vacant 28th August, tenable for 12 months and recognised for F.R.C.S.

RESIDENT HOUSE PHYSICIAN. Now vacant, tenable for 6 months and recognised under pre-registration service scheme.

The Royal Infirmary, Bolton (238 Beds)

RESIDENT HOUSE SURGEON. Now vacant, tenable for 6 months, and recognised under pre-registration service scheme. Also recognised for F.R.C.S.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Locum ANÆSTHETIC REGISTRAR required immediately for an indefinite period. Duties mainly at Royal Victoria Hospital, Boscombe, with occasional duties at Westbourne and Poole General Hospitals.

Applications to the Group Secretary, Hospital Management Committee Office, Shelley-road, Boscombe.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of 2 HOUSE SURGEONS. The appointments, which become vacant on 14th and 29th October, 1958, are recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Geriatric Unit. This is a large Unit with an active rehabilitation section, which provides excellent clinical facilities. Vacant 16th September, 1958.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, should be sent to the Physician-Superintendent, Brighton General Hospital, Elmgrove, Brighton, 7.

BRIGHTON. ROYAL ALEXANDRA HOSPITAL FOR SICK CHILDREN, Dyke-road, BRIGHTON. BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. (137 Beds and Cots.) Vacancy for HOUSE PHYSICIAN for 6 months. The post offers wide experience in pædiatrics and is recognised for D.C.H.

Applications, stating age, nationality, qualifications, and experience, together with copies of recent testimonials, to be sent to the Administrative Officer as soon as possible.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) CASUALTY HOUSE SURGEON required end August. Duties include work in orthopædic and traumatic unit. Recognised for pre-registration and F.R.C.S.

Applications, stating age, qualifications, experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer grade) required for 1 year, with interchange of duties, by agreement, at the Brighton General Hospital and other specialised units within the Brighton and Lewes Group. Post recognised for F.F.A. R.C.S. and D.A.

Applications, stating age, qualifications, experience, &c., and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. SUSSEX EYE HOSPITAL. (56 Beds.) HOUSE SURGEON required end of August. Recognised for F.R.C.S. and D.O. Successful applicant will be considered for post of Senior House Surgeon on completion of 6 months.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. FRENCHAY HOSPITAL. Applications invited for appointment of SENIOR HOUSE OFFICER in the regional department of thoracic surgery (100 Beds). Post provides experience in cardiac, œsophageal and pulmonary surgery, and is recognised for Fellowship Examinations of the Royal College of Surgeons. Vacant 1st September, 1958, tenable for 6 months, renewable by mutual agreement.

Apply to Group Secretary, Frenchay Hospital, Bristol, stating age and experience, and naming 2 referees.

BRISTOL. MANOR PARK HOSPITAL. (650 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER. Salary £852 10s.–£55–£1182 10s. Unfurnished flat available at moderate rent. The Hospital caters largely for chronic illness in the older age group, with some acute medical work. Consultant staff visit regularly, and there is ample time for postgraduate study.

Applications, stating age, nationality, whether married or single, experience, qualifications, and names and addresses of 2 referees, to be sent to the Group Secretary, Manor Park Hospital, Manor-road, Fishponds, Bristol, within 7 days of the appearance of this advertisement.

BURNLEY VICTORIA HOSPITAL. (171 Beds.) Burnley AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE OFFICER (medical). The appointment is approved as a pre-registration post. Post now available.

Applications, with 2 references, to Group Secretary, Burnley General Hospital.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE OFFICER (orthopædics) (pre-registration post) required at the above Hospital. Recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Senior REGISTRAR (non-resident) and REGISTRAR in Anæsthetics (resident) required from mid-October, 1958.

Apply, with full particulars and names of 3 referees, to Secretary, Addenbrooke's Hospital, Cambridge, by 1st September, 1958.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Registrar in Obstetrics and Gynæcology (non-resident) for 1 year in the first instance from mid-November, renewable for second year. Duties include responsibilities at Cambridge Maternity Hospital.

Apply, with full particulars and names of 3 referees, to Secretary, by 8th September, 1958.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months' appointment. Post vacant mid-September. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of PÆDIATRIC HOUSE PHYSICIAN, recognised for D.C.H., includes work in the ward and Outpatient Department and also provides experience in the care of the newborn. Opportunities exist for the study of preventive medicine among children and child guidance work. Post vacant end of September, 1958. National Health Service salary and conditions.

Applications, together with copies of 2 testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 acute general beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Anæsthetics required. This post offers excellent opportunities for training and experience.

Applications, with full details and copies of 2 recent testimonials, to be sent to the Group Secretary, Central Office, Nunnery Fields Hospital, Canterbury.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (casualty) which becomes vacant mid-September, 1958. Salary £819 10s. p.a. Recognised for the F.R.C.S.

Applications to be sent to the Hospital Secretary at the above Hospital, together with copies of 3 recent testimonials.

CARDIFF ISOLATION HOSPITAL. (219 Beds.) Senior HOUSE OFFICER required at above Hospital. Hospital serves wide area, gives opportunity for study of infectious diseases; has poliomyelitis respiratory unit and medical and convalescent beds. Post vacant late August.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF (near). PRINCE OF WALES ORTHOPÆDIC HOSPITAL, RHYDLAFAR, near CARDIFF. SENIOR HOUSE OFFICER required at above Hospital. Married or single accommodation available.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. ROOKWOOD HOSPITAL. Senior House OFFICER (surgical) required at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR HOUSE OFFICER in General Medicine at Llandough Hospital. Non-resident post, to commence late October/early November.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) CASUALTY OFFICERS (2), Senior House Officers. Posts recognised for F.R.C.S. Vacant 10th and 17th September, respectively.

Applications, stating age, qualifications, and experience, with copies of testimonials and the names of 2 referees, should be sent to the Group Secretary at above address.

CARLISLE. CUMBERLAND INFIRMARY. Senior HOUSE OFFICER (general surgery) required.

Apply to the Group Secretary, East Cumberland Hospital Management Committee, Cumberland Infirmary, Carlisle.

CHATHAM, KENT. ALL SAINTS' HOSPITAL. Medway AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON, recognised for F.R.C.S. and vacant 7th September, 1958. Salary £467 10s.–£577 10s. p.a., according to experience.

Applications, stating age, qualifications, nationality, and experience, together with copies of 3 recent testimonials, to the Hospital Secretary.

CHELMSFORD, ESSEX. BROOMFIELD HOSPITAL. Required, experienced Locum Tenens SENIOR REGISTRAR for 6 months from 1st September, 1958, full residence or only when on duty. Unit has 312 Beds for the treatment of pulmonary tuberculosis in adults. Tuberculous and non-tuberculous thoracic surgery, chest clinics, and mass radiography.

Apply Physician-Superintendent.

CHELTENHAM MATERNITY HOSPITAL. Cheltenham GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of RESIDENT OBSTETRIC OFFICER. The Hospital, which is recognised for the purpose of training for the D.Obst.R.C.O.G., has 50 Beds, and deals with the majority of abnormal midwifery cases in North East Gloucestershire. The appointment is for a period of 6 months, and the salary will be £577 10s., less charge for residential emoluments. The appointment will be vacant mid-September.

Applications, stating age, qualifications, and experience, and accompanied by copies of 3 recent testimonials, should be sent to the Secretary, Cheltenham General Hospital, Cheltenham.

CHEPSTOW, MONMOUTHSHIRE. ST. LAWRENCE HOSPITAL. (132 plastic surgery, 50 orthopædic beds.) SENIOR HOUSE OFFICER in Plastic Surgery required. There is another Senior House Officer in Plastic Surgery and 1 in Orthopædics. Post tenable 6 or 12 months, as desired. Candidates experienced in another specialty wishing to gain plastic surgery experience will be considered. Salary £819 10s. p.a., less £150 for board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary, 64, Cardiff-road, Newport, Mon.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (430 Beds.) ANÆSTHETIC REGISTRAR required. Post recognised for F.F.A. R.C.S. and D.A. Hospital may be visited by arrangement with Physician-Superintendent (telephone: Ottershaw 441).

Application forms from Secretary, Woking and Chertsey Hospital Management Committee, Huntington, Guildford-road, Chertsey, Surrey. Closing date 1st September.

CHESTERFIELD. SCARSDALE HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER required 1st September for Geriatric Unit and for duties at Penmore Hospital. Full Consultant services. Excellent scope for doctor interested in this specialty. House available on service tenancy.

Applications, giving full particulars, with the names of 3 referees, to Group Secretary, Chesterfield Hospital Management Committee, at Chesterfield Royal Hospital.

CHESTERFIELD ROYAL HOSPITAL. Casualty Officer (Senior House Officer) required end September. Post recognised F.R.C.S. purposes.

Apply, with copies of testimonials, or names of 2 referees, to the Group Secretary, Chesterfield Hospital Management Committee, immediately, from whom particulars are obtainable.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for:—

Essex County Hospital, Colchester, Essex (181 Beds)

Post of Locum SURGICAL REGISTRAR. Required early September.

Post of SENIOR HOUSE OFFICER to Casualty and Radiotherapy Departments. Tenable for 6 months or 1 year. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CUCKFIELD HOSPITAL, Cuckfield, near Haywards HEATH. MID-SUSSEX HOSPITAL MANAGEMENT COMMITTEE. Vacancies:—

JUNIOR HOUSE SURGEON (general surgery). Pre-registration post, now vacant.

SENIOR HOUSE PHYSICIAN. Post vacant 4th September, 1958.

SENIOR HOUSE OFFICER (general surgery). Post recognised for Fellowship, vacant 1st September, 1958.

JUNIOR HOUSE SURGEON (Orthopædic and Traumatic Unit). Post vacant September, 1958.

Apply Hospital Secretary in each case, stating age, nationality, qualifications, and experience, with names of 2 referees.

DERBY. CITY HOSPITAL. Derby No. 1 Hospital Manage- MENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON. Pre-registration or Senior House Officer (surgical). Recognised for the F.R.C.S. if held by a Senior House Officer. Post vacant 17th September.

Applications, stating full details, together with copies of 2 recent testimonials, should be sent to the Medical Superintendent, City Hospital, Derby, as soon as possible.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (casualty). Vacant 22nd September, resident post. Recognised for periods of 6 months' casualty training for F.R.C.S. The staffing of the department is a Senior Casualty Officer and 2 Senior House Officers.

Apply, stating age, experience, and 2 names for reference to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (orthopædic). Vacant 1st September. Recognised for 6 months' "unspecified" training for F.R.C.S.

Apply, giving full details and 2 names for reference, to Secretary.

DERBY. KINGSWAY HOSPITAL. (912 Beds. Recognised for D.P.M.) SHEFFIELD REGIONAL HOSPITAL BOARD. Wholetime RESIDENT or NON-RESIDENT REGISTRAR (psychiatry) required immediately. Facilities for postgraduate study in conjunction with Sheffield University available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st September, 1958, giving age, nationality, qualifications, present and previous appointments (with dates), naming 3 referees.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. (128 Beds.) Applications are invited for the pre-registration post of HOUSE PHYSICIAN (general medicine and paediatrics) which is now vacant.

Applications, giving full details, should be sent to the Administrative Officer at the Hospital as soon as possible.

DRIFFIELD, YORKSHIRE. EAST RIDING GENERAL HOSPITAL. (247 Beds.) HOUSE SURGEON (first, second or third post). Vacant now. General surgery, casualty and some orthopædics. Approved pre-registration post. Fully qualified practitioners may apply. Married quarters may be available.

Applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DUNFERMLINE NORTHERN HOSPITAL. (General medical. 101 Beds.) WEST FIFE HOSPITALS BOARD OF MANAGEMENT. HOUSE PHYSICIAN required to commence 1st October, 1958; 1 of 2 pre-registration service posts. Substantial turnover of inpatients, and usual outpatient sessions. Resident staff consists of 1 Junior Hospital Medical Officer and 2 House Physicians.

Applications, with copy references, to the Medical Superintendent.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR, Peterborough Hospital Group. Main hospital, Peterborough Memorial (150 Beds). Duties may include work in Peterborough Isolation and St. John's Hospitals and Thorpe Hall Annexe. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 8th September, 1958. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Memorial Hospital, Peterborough.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT HOUSE SURGEON. Post vacant end of September, 1958. Recognised for F.R.C.S. and pre-registration purposes.

Applications, stating age, experience, and qualifications, to Medical Administrator of Hospital by 5th September, 1958.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. Locum CASUALTY OFFICER (Registrar grade) required for period 1st–20th September, 1958. Non-resident. Hours: 9 A.M.–5.30 P.M. Monday to Friday; 9 A.M.–1 P.M. Saturday.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. Locum OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR required for obstetric and gynæcological duties from 1st September, 1958, for period of not less than 6 weeks. M.R.C.O.G. desirable. Non-resident appointment, but will be required to sleep in when on duty.

Applications, with names and addresses of 2 referees, to Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON. Pre-registration post. Vacant 3rd September, 1958. Duties with General Surgical Unit, doing some Genitourinary work. Post recognised by the Royal College of Surgeons. 6-month appointment.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT PATHOLOGIST (Senior House Officer grade) required for duties in the Area Laboratory and at other hospitals in the group. The Area Laboratory is recognised for the Diploma of Pathology and offers opportunity for training in all branches of pathology. Further information can be obtained from the Senior Pathologist. Appointment vacant 1st October, 1958, and tenable for 1 year.

Apply, stating age, qualifications, experience, nationality, and the names of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, by 6th September, 1958.

EPPING. ST. MARGARET'S HOSPITAL. Resident SENIOR HOUSE OFFICER (obstetrics and gynæcology). Vacancy occurring 1st October, 1958. Post recognised for D.Obst.R.C.O.G. Busy general hospital with easy access to London.

Applications, with 2 recent testimonials, to the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage", The Plain, Epping, Essex, by 5th September, 1958.

EPPING. ST. MARGARET'S HOSPITAL. Senior House OFFICER (chest diseases and casualty) required for Tuberculosis Wards in busy general hospital. 40 chest diseases beds run in conjunction with Clinic within the grounds. Good experience in modern methods. Candidate required to devote one-third of time to casualty duties. Appointment vacant 1st October, 1958.

Applications, with copies of 2 recent testimonials, to be sent to the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 5th September, 1958.

GRIMSBY GENERAL HOSPITAL. (Unit of 46 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (pre-registration) required for above Hospital. Medical library and reading facilities available.

Applications, with names of 2 referees, to the Hospital Secretary, Grimsby General Hospital, Grimsby.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædics). Orthopædic Unit of 58 Beds. Resident establishment Registrar and 2 House Officers. Up-to-date medical library and reading facilities available.

Applications, with names of 2 referees, to Hospital Secretary.

GRIMSBY GENERAL HOSPITAL. Senior House Officer required for Casualty Department. Establishment consists of Senior Casualty Officer and 2 Senior House Officers. Excellent Medical Library taking principal periodicals.

Applications, with names of 2 referees, to Hospital Secretary.

GLASGOW. HAWKHEAD (MENTAL) HOSPITAL, 510, Crookston-road, GLASGOW, S.W.3. Applications are invited for the post of SENIOR HOUSE OFFICER in Psychiatry. Resident or non-resident. Facilities for training in all aspects of psychiatry. All modern methods of treatment carried out. Recognised for D.P.M.

Applications, with names of 2 referees, should be forwarded as soon as possible to Physician-Superintendent at the above address.

GLASGOW NORTHERN HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics and Gynæcology at Western District Hospital, Glasgow, which becomes vacant on 1st October, 1958. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications, experience, and present appointment, and naming 2 referees, to be lodged with the Secretary, 13, Woodside-place, Glasgow, C.3, by 3rd September, 1958.

GLOUCESTER. HORTON ROAD AND CONEY HILL HOSPITALS. (1540 Beds.) Applications invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER. Hospitals serve the North Gloucestershire Clinical Area including, Gloucester, Cheltenham, Stroud and Forest of Dean. High admission-rate (850). All modern methods of treatment. New units provide for treatment of neurosis and alcoholism. Expanding outpatient services, day hospital, annexes, and social clubs. Accommodation may be available for married applicant. Encouragement and opportunity for study. Salary and conditions Whitley Council.

Applications, with names of 3 referees, to Physician-Superintendent.

GREENOCK. RAVENSCRAIG HOSPITAL (Mental and General). Applications are invited for the post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female). The post offers experience in all branches of psychiatry, including modern forms of treatment, and outpatient clinics. Experience is available also in the medical and geriatric wards. The Hospital is recognised for the D.P.M., and facilities will be granted to attend courses in Glasgow.

Applications, with full details and the names of 2 referees, to be forwarded to the Physician-Superintendent.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. Locum HOUSE PHYSICIAN wanted for 2 weeks in late September, 1958. 38 medical beds and some neurology.

Apply Hospital Secretary. Guildford 2323.

HALIFAX. NORTHOWRAM HALL HOSPITAL. (108 Beds.) SENIOR HOUSE OFFICER in Chest Diseases required. Post vacant 1st October, 1958. Duties include attendance at busy Chest Clinic at the Royal Halifax Infirmary and non-tuberculous chest ward work. This post offers excellent facilities for the study of chest diseases, and experience is available with bronchoscopies and bronchograms. Salary £819 10s. p.a., with a deduction of £150 p.a. for board residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS AND ST. LEONARDS. BUCHANAN HOS-PITAL. (91 Beds.) Locum SENIOR HOUSE OFFICER (obstetrics) required, 8th–15th September, 1958, inclusive. Salary £15 19s. a week, less board.

Apply, with names of 2 referees, to the Administrator, Buchanan Hospital, St. Leonards-on-Sea.

HASTINGS GROUP HOSPITAL MANAGEMENT COM-MITTEE. Locum SENIOR HOUSE OFFICER (anæsthetics) required. Salary £15 19s. per week. From 25th August to 14th September, 1958.

Applications, with copies of 2 testimonials or names of 2 referees, to Group Secretary, 11, Holmesdale Gardens, Hastings.

HASTINGS GROUP HOSPITAL MANAGEMENT COM-MITTEE. Locum RESIDENT SURGICAL OFFICER (general surgery) required 23rd August–20th September, 1958. Salary £19 5s. per week. Non-resident.

Applications, with copies of 2 testimonials or names of 2 referees, to Group Secretary.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON. Pre-registration post for general surgery and urology required at this acute hospital (surgical). Post vacant 1st October, 1958.

Applications, with names of 2 referees, to Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) Applications are invited for the post of CASUALTY AND ORTHOPÆDIC HOUSE SURGEON or LOCUM (1 of 2 posts), graded Senior House Officer, for the Royal East Sussex Hospital, Hastings. Modern department. Hospital is pleasantly situated facing the sea. Post vacant 22nd August, 1958.

Applications, with names of 2 referees, to the Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. ST. PAUL'S HOSPITAL. HOUSE PHYSICIAN (pre-registration) required to commence 4th October, 1958.

Applications, giving details and enclosing copies of 2 recent testimonials, should be sent to the Hospital Secretary.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (paediatrics), which is recognised for the D.C.H.

Applications, together with copies of 2 recent testimonials, should be sent to the Hospital Secretary at once.

HEMEL HEMPSTEAD. ST. PAUL'S AND WEST HERTS HOSPITALS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Obstetrics and Gynæcology (resident) required at above Hospitals, which may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 2nd September, 1958.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Paediatrician and Ophthalmic Consultant. Salary £819 10s. p.a., less £150 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 12th September, 1958. Applicants offering short-term locum periods considered.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, Hertford County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.) HOUSE SURGEON for Ophthalmic and Ear, Nose and Throat Departments.

Apply, stating age, qualifications, nationality, experience, and enclosing copies of not more than 3 recent testimonials, to Medical Director by 2nd September, 1958.

HOVE GENERAL HOSPITAL. Pre-registration House PHYSICIAN required for a period of 6 months from 4th September, 1958. Excellent clinical material available and post is suitable for candidate working for a higher degree.

Applications, stating age, qualifications and full details of experience, together with names and addresses of 2 referees, to the Administrative Officer, Hove General Hospital, Sackville-road, Hove, 3.

HOVE GENERAL HOSPITAL. House Surgeon (pre-registration) with ward and casualty duties required for a period of 6 months from 1st September, 1958. This post is recognised for the F.R.C.S. and provides a wide experience in an active surgical unit.

Applications, stating age, qualifications, and full details of experience, together with names and addresses of 2 referees, to the Administrative Officer, Hove General Hospital, Sackville-road, Hove, 3.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE PHYSICIAN. Pre-registration post.

Applications, with 2 recent testimonials, to the Hospital Secretary.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE PHYSICIAN. Duties in an active Geriatric Unit for the investigation and treatment of acute and long-term illness. Post vacant 1st September, 1958.

Applications, with 2 recent testimonials, to the Hospital Secretary.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (medical), now vacant. The selected candidate will be required to look after medical and pædiatric cases and may be called upon to give emergency anæsthetics.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

HUNTINGDON COUNTY HOSPITAL. Locum Tenens SENIOR HOUSE SURGEON required now for an appointment of approximately 6 weeks' duration.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. House SURGEON. Duties include plastic surgery and orthopædic surgery (58 orthopædic beds and 18 plastic surgery beds). Large outpatient clinics. Post vacant now.

Applications to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 9th September, 1958.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER, E.N.T. Department. Resident post, recognised for D.L.O. and F.R.C.S. Vacant 7th October, 1958. Good experience 3–4 operating sessions weekly. Previous E.N.T. experience preferable but not essential.

Applications, stating age, qualifications, and experience, with copies of up to 3 testimonials, to the Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, by 3rd September, 1958.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath-road Wing). (280 Beds.) Locum Tenens CASUALTY OFFICER (Senior House Officer) required 15th September, for 4 weeks. The post is normally non-resident but accommodation can be provided.

Applications, with full particulars, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for post of HOUSE SURGEON to Fracture and Orthopædic Department, vacant mid-September. Approved pre-registration post.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for post of HOUSE SURGEON to the Senior Consultant General Surgeon, vacant mid-September. Post recognised for pre-registration and F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH. ST. HELEN'S HOSPITAL. (129 Beds for infectious diseases, pulmonary tuberculosis, long-stay orthopædics and geriatrics. The area Chest Clinic is in the Hospital.) HOUSE PHYSICIAN required (post-registration appointment). Accommodation available for married man.

Applications to JOHN WILLIAMS, Group Secretary, Ipswich Group Hospital Management Committee, at the Ipswich and East Suffolk Hospital (Anglesea-road Wing), Ipswich.

KETTERING AND DISTRICT GENERAL HOSPITAL. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. The post, vacant early September, 1958, offers wide experience of all traumatic conditions including fractures and some orthopædic cases, with charge of 30 Beds.

Applications, accompanied by testimonials, to be sent to the Group Secretary, General Hospital, Kettering.

KETTERING AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER to the Geriatric Unit in this area. There are 160 active beds in the unit in 3 hospitals. Post now vacant. Married residential accommodation available. National scale of salary.

Applications, together with the names and addresses of 2 referees, to the Group Secretary, Central Administration Offices, General Hospital, Kettering.

KIDDERMINSTER AND DISTRICT GENERAL HOS-PITAL, WORCESTERSHIRE. (112 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON at the above Hospital. Post vacant now.

Applications to the Hospital Secretary.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston-ON-THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of SENIOR HOUSE OFFICER (casualty and orthopædic) which is available on 1st October, 1958. The post is recognised in Casualty for F.R.C.S. purposes.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Applica-tions are invited from Men and Women for the resident post of SENIOR HOUSE OFFICER in Medicine which is vacant immediately and tenable for 6 months.

Applications, with copy testimonials, should be sent to the Secretary.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Chest Diseases

(i) Leeds Chest Clinic and additional duties, as required, at Regional Sanatoria. Previous experience in diseases of the chest desirable. Accommodation for a single person only at Killingbeck Hospital.

(ii) Scotton Banks Sanatorium, Knaresborough (150 staffed beds). Visiting staff includes Teaching Hospital Consultants. Preferably resident.

Obstetrics and Gynæcology

Leeds A Group. Duties to alternate (6-month periods) between St. Mary's Hospital, Leeds (109 obstetric beds), and St. James's Hospital, Leeds (75 obstetric and 52 gynæcological beds). Resident. Recognised for M.R.C.O.G.

Infectious Diseases

Leeds Road Hospital, Bradford (120 infectious diseases beds). Accommodation for a single person only.

Ophthalmology

Hospital Eye Department, Halifax. 18 Beds with special theatre and outpatient unit.

Otolaryngology

Huddersfield and Halifax Groups (non-resident). Successful candidate to reside in Huddersfield. Recognised for the Fellowship and the D.L.O.

Psychiatry

Stanley Royd Hospital, Wakefield (2000 Beds). Recognised for D.P.M. If desired facilities for attendance at the University of Leeds will be provided if the successful candidate is studying for the D.P.M.

Thoracic Surgery

At Thoracic Surgery Units at the Bradford Royal Infirmary and the Middleton Hospital (aggregate of 61 Beds, both non-tuberculous and tuberculosis cases.) Non-resident.

Applications, stating age, qualifications, and details of present and previous appointments (with dates), together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 27th August, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. Maternity HOSPITAL AT LEEDS. RESIDENT SURGICAL OFFICER of Registrar status required for 1 year in the first instance from 1st November, 1958. Conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts (with dates), and 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 1, before 7th September, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. HOUSE OFFICERS required in the Departments of Urology and Neurosurgery. The posts are tenable for 6 months from 1st August, 1958. Salary according to grade. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts (with dates), and 3 names for reference, to be sent to the Secretary to the Board, The General Infirmary, Leeds, 1, immediately.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. Applications are invited for the post of REGISTRAR in the Department of Psychiatry (Leeds University) to work at the General Infirmary at Leeds. Some previous experience in psychiatry necessary. Facilities are available for attendance at the course of the Leeds University D.P.M. or for preparation for a higher degree.

Applications, including the names of 3 referees, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by not later than 30th August, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. RESIDENT SURGICAL OFFICER of Registrar status required for 1 year in the first instance. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts (with dates), and 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 1, not later than 30th August, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. SENIOR REGISTRAR in Anæsthetics required for duties within the Teaching Hospital Group. Terms and conditions of service for hospital medical staffs apply.

Applications, stating age, qualifications, experience (with relevant dates), and giving 3 names for reference, to be forwarded to the Sub-Dean, the Medical School, Leeds, 2, by not later than 7th September, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. SENIOR HOUSE OFFICER in Anæsthetics required for duties within the United Leeds Hospitals. Terms and conditions of service for hospital medical staffs apply.

Applications, stating age, qualifications, experience (with relevant dates), and giving 3 names for reference, to be forwarded to The Secretary to the Board, The General Infirmary, Leeds, 1, by not later than 7th September, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. Applications are invited for the post of HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER at the Chapel Allerton Hospital Leeds. Post vacant now. The post offers experience in surgical neurology, E.N.T., and ophthalmic surgery. The officer will work under the Consultants of the General Infirmary, and the post offers facilities for study for higher qualifications.

Applications, stating age, qualifications, and the names of 3 referees, should be sent immediately to the Secretary to the Board, The General Infirmary, Leeds, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the Cardiological Department for the period 1st October, 1958, to 30th September, 1959.

Apply immediately on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for following HOUSE OFFICER posts for the 6 months beginning 1st September, 1958:—

HOUSE PHYSICIAN and HOUSE SURGEON at the Heswall Branch.

ORTHOPÆDIC HOUSE SURGEON at the City Branch.

The posts are open to both pre-registration and registered practitioners and are recognised for the D.C.H.

Apply immediately on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. Locum Whole-time SENIOR SURGICAL REGISTRAR required from 15th September, 1958, for a period of probably 3 months or more. Required to be resident for 7 nights in 14.

Applications, giving full particulars, and names of referees, to the Secretary, Luton and Dunstable Hospital, as soon as possible.

MACCLESFIELD HOSPITAL. (300 Beds.) Applications invited: SENIOR HOUSE OFFICER in Medicine and Pre-registration HOUSE OFFICER in Medicine. Department has 62 acute beds. Excellent opportunities for gaining valuable experience.

Apply immediately, with names and addresses of 2 referees, to Group Secretary, Macclesfield and District Hospital Management Committee, Willerby House, Cumberland-street, Macclesfield.

MACCLESFIELD HOSPITAL (Infirmary Branch). Pre-registration HOUSE OFFICER in Surgery. Acute Surgical Unit of 100 Beds. Recognised for F.R.C.S. purposes. Main casualty duties undertaken by Senior Resident Practitioner.

Apply immediately to Group Secretary, Macclesfield and District Hospital Management Committee, Willerby House, Cumberland-street, Macclesfield, together with names and addresses of 2 referees.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER 9. (380 Beds.) Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST, Senior House Officer grade, which will become vacant during August, 1958. The post, which is tenable for 1 year, affords opportunities for training in all branches of pathology. Candidates should have held house appointments, but previous experience in pathology is not essential.

Application form from Group Secretary.

MANCHESTER. CRUMPSALL HOSPITAL. Applications are invited for the post of REGISTRAR or SENIOR HOUSE OFFICER, according to experience, in the Department of Neurosurgery at the above Hospital. Vacant 15th September, 1958. A new department of over 20 Beds for adult cases is being started and will become a self-contained unit. Facilities will be made available for the successful applicant to gain experience in psycho-surgery at neighbouring hospitals, and, if desired, pædiatric neurosurgery.

Applications, with 2 referees, by 1st September, 1958, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of MEDICAL REGISTRAR at the Devonshire Royal Hospital, Buxton, vacant on 11th September, 1958. The main duties will be in the Department of Physical Medicine, with some duties in the Hospital. The post offers excellent opportunities in research. Previous physical medicine experience desirable. Interest in experimental work an advantage. Unfurnished accommodation on rental may be made available to male married applicant.

Applications, together with the names of 2 referees, to be forwarded to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for post RESIDENT or NON-RESIDENT ORTHOPÆDIC REGISTRAR to Macclesfield District Group hospitals. Main duties Infirmary Branch, Macclesfield Hospital. To include visits to other hospitals in the Group. Hospital recognised for F.R.C.S. regulations.

Apply immediately, with names and addresses of 2 referees, to Group Secretary, Willerby House, Cumberland-street, Macclesfield.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of RESIDENT REGISTRAR in General Surgery, vacant 29th September, 1958. The duties will be with the Stockport and Buxton Hospital Management Committee as Resident Surgical Officer at Stockport Infirmary.

Applications, stating age, experience and qualifications, together with the names of 2 referees, to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD. Bury AND ROSSENDALE and ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEES. Applications are invited for the post of REGISTRAR in Pædiatrics which will be vacant on 30th September, 1958. The successful applicant, who may be either resident or non-resident, will have duties in the neonatal departments and children's units at hospitals in the above Groups, which are recognised for the D.C.H. The person appointed to the post will supervise the work of Senior House Officers in both Groups and assist the Consultant Pædiatrician.

Apply, stating full details of experience and qualifications, together with names of 2 referees, to H. WILKINSON, Group Secretary, Bury General Hospital, Bury, Lancs.

MANCHESTER, UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR REGISTRAR to University Department of Neurosurgery. Whole-time, non-resident post, tenable for 12 months, renewable. Applicants must possess a higher qualification.

Application form obtainable from the undersigned, to be returned by 30th August, 1958.

A. B. SCOTT, Secretary to the Board of Governors.

MANCHESTER. WITHINGTON HOSPITAL. (1082 Beds.) MANCHESTER REGIONAL HOSPITAL BOARD. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of REGISTRAR in the Department of Pathology. The post is recognised for the Diploma in Pathology, and offers excellent facilities and training in all branches of clinical pathology.

Applications, stating age, qualifications and experience, and the names of 2 referees, should be forwarded to the Group Secretary, Withington Hospital, as soon as possible.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics and Gynæcology. The Hospital takes part in undergraduate medical teaching, and the post is recognised in obstetrics and gynæcology for M.R.C.O.G. purposes.

Application forms should be obtained from the Group Secretary at the above address.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (orthopædics) required at the above Hospital, vacant from October, 1958. This post offers excellent experience for persons who ultimately intend to specialise in orthopædics and accident work. In addition to the routine orthopædic duties of a general hospital the unit carries out the reconstructive surgical programme of patients from the Devonshire Royal Hospital, Buxton, which has a regional catchment area.

Applications, with full details and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, as soon as possible.

MAIDENHEAD HOSPITAL, Berkshire. Applications invited for post of HOUSE PHYSICIAN, vacant 19th October, 1958. Pre-registration post.

Applications, stating qualifications, age and nationality, to Secretary.

MEXBOROUGH. MONTAGU HOSPITAL AND ANNEXE. (198 Beds.) Locum SENIOR HOUSE OFFICER (casualty and orthopædics) required.

Applications to the Secretary to the Committee, Fern Bank, Doncaster-road, Rotherham.

MEXBOROUGH. MONTAGU HOSPITAL AND ANNEXE. (198 Beds)—22 obstetrics, 15 gynæcology.) Locum SENIOR HOUSE OFFICER (obstetrics and gynæcology) required 6th–23rd September, 1958.

Applications to Secretary, Hospital Management Committee, Fern Bank, Doncaster-road, Rotherham.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of HOUSE PHYSICIANS (2), Male or Female, at the above Hospital. The Medical Unit consists of 52 Beds. These appointments are at present vacant and may be pre-registration House Officer or Senior House Officer grade, according to experience.

Applications, stating age, qualifications, and experience, together with names of 2 referees, should be addressed to the Hospital Secretary as soon as possible.

NANTWICH. BARONY HOSPITAL. South Cheshire HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR HOUSE OFFICER (medical) required for holiday duty for 2 weeks commencing 24th September, 1958. Salary as per Whitley Council scale.

Apply immediately, stating age, qualifications, &c., with names of 2 referees, to the Group Secretary, Barony Hospital, Nantwich, Cheshire.

NEATH. TONNA CHILDREN'S HOSPITAL, Tonna, NEATH. Applications are invited for the post of SENIOR HOUSE OFFICER (paediatrics, E.N.T., ophthalmic, orthopaedic, and traumatic). Post under supervision of Consultant Paediatrician and particularly suited to candidates studying for the D.C.H.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, Mid-Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

NEWBURY DISTRICT HOSPITAL, Newbury, Berkshire. Locum RESIDENT SURGICAL OFFICER (Senior House Officer grade) required for period 1st–14th September, 1958.

Applications to Secretary.

NEWCASTLE GENERAL HOSPITAL. (800 Beds.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER, Orthopaedic Department. Vacant immediately. Recognised for F.R.C.S. diploma. A new orthopaedic ward is planned to come into service in September, 1958.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE GENERAL HOSPITALS. (Chest Unit.) SENIOR HOUSE OFFICER required (resident or non-resident). Facilities available for studying for the D.P.H. (University of Durham). Further particulars may be obtained from the Senior Chest Physician.

Applications should be sent together with the names and addresses of 2 referees to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR PSYCHIATRIST, whole-time, resident, Department of Psychological Medicine, Newcastle General Hospital. The Department is under the clinical direction of the Professor of Psychological Medicine, University of Durham. Good experience and training in psychiatry offered. Facilities are available for the appointee to take the Durham University D.P.M. course. Married or single accommodation available. Further particulars from Regional Psychiatrist.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. East CUMBERLAND GROUP OF HOSPITALS. SURGICAL REGISTRAR (resident) (whole-time) required, for 1 year in the first instance, with the likelihood of extension. Main duties at the Cumberland Infirmary, Carlisle (340 Beds), where the Registrar will have duties in the casualty department and in the wards. The post is recognised under the F.R.C.S. regulations. If required, house available for successful candidate, furnished or unfurnished.

Applications, together with names and addresses of 1–3 referees and/or 1–3 testimonials, to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND GROUP OF HOSPITALS. REGISTRAR in Obstetrics and Gynecology to be based at Whitehaven Hospital (17 obstetric beds, 13 gynaecology beds). The appointment will be held for 1 year in the first instance, with likelihood of extension. Furnished house available if required.

Applications to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE UPON TYNE. ST. NICHOLAS HOS-PITAL, GOSFORTH, NEWCASTLE UPON TYNE, 3. ST. NICHOLAS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (2 years in first instance). This Mental Hospital (1150 Beds) affords opportunities for experience of all modern methods of investigation and treatment. There is an extensive outpatient service, and facilities are given to study for the D.P.M.

Applications, giving details of qualifications and experience, together with names and addresses of 2 referees, to be submitted to the Group Secretary.

NEWPORT, MONMOUTHSHIRE. ST. WOOLOS HOS-PITAL. (379 Beds.) SENIOR HOUSE OFFICER required in Thoracic Medicine and Surgery. The post covers 28 non-tuberculous chest beds and 4 thoracic surgery beds. The successful candidate will also attend at Chest Clinics. Salary £819 10s. p.a., less £150 board-residence.

Apply, quoting 2 referees, to T. A. JONES, Group Secretary, 64, Cardiff-road, Newport, Mon.

NORTHAMPTON (near). CREATON HOSPITAL. Applications are invited from suitably qualified medical practitioners for the post of SENIOR HOUSE OFFICER. The Hospital has 138 Beds, and is for the treatment of both pulmonary and non-pulmonary tuberculosis. There is a major thoracic surgical unit for tuberculosis and non-tuberculous diseases of the chest.

Applications, stating age, experience and qualifications, together with the names and addresses of 2 referees, should be sent to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton, within 7 days of the appearance of this advertisement.

NEWTON ABBOT HOSPITAL. Resident Senior House SURGEON, Male or Female, required immediately, to act as Casualty Officer and House Surgeon to special departments, together with relief duties. Ability to give outpatient anaesthetics advantageous. Married quarters available.

Applications (quoting reference F.364/41), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, South Devon.

NEWTON ABBOT HOSPITAL, South Devon. Senior HOUSE OFFICER (medicine), Male or Female required, 30th September, 1958. Duties divided equally between 20 acute medical beds in general section and 140 geriatric beds. This Officer is also required to stand in when Senior House Surgeon otherwise engaged. Married quarters available.

Applications, stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, South Devon.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of SENIOR HOUSE OFFICER (surgical) which will be vacant early September. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) (Recog-nised for pre-registration purposes.) Applications are invited for the post of HOUSE OFFICER (obstetrics and gynaecology), which will be graded Senior House Officer or House Officer in accordance with experience. Recognised for the M. and D.Obst. R.C.O.G. Post vacant on 6th October, 1958.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Appli-cations are invited for the post of HOUSE SURGEON, vacant immediately. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Pre-registra-tion HOUSE SURGEON required. Duties to commence 5th October, 1958.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to Group Secretary.

OLDHAM AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of Locum SENIOR HOUSE OFFICER (general surgery). Vacant immediately, with duties at the Oldham Royal Infirmary and/or the Oldham and District General Hospital. The appointment will be tenable for a period of approximately 6 months.

Applications, quoting full particulars of qualifications and experience, together with the names and addresses of 2 referees, should be sent immediately to the Group Secretary, Oldham and District Hospital Management Committee, Central Offices, Rochdale-road, Oldham.

ORPINGTON HOSPITAL, Orpington, Kent. Pre-registra-tion HOUSE SURGEON, post vacant 1st September, 1958. Excellent experience offered in large general hospital (588 staffed beds). Pleasantly situated and convenient for London.

Apply to Surgeon-Superintendent immediately with copies of 2 testimonials.

OTLEY, YORKSHIRE. THE GENERAL HOSPITAL. (172 Beds.) RESIDENT MEDICAL OFFICER required (general medicine and paediatrics). Junior Hospital Medical Officer or Senior House Officer. Full Consultant Staff who are members of the Teaching Staff of The University of Leeds. Single quarters in Hospital or unfurnished self-contained flat nearby. Duties to commence as soon as possible.

Applications, stating age, nationality, and experience, with names of 2 referees, to the Group Secretary, Ilkley and Otley Hospital Management Committee.

OXFORD REGIONAL HOSPITAL BOARD. Locum (obstetrics and gynaecology) Registrar or Senior Registrar, whole-time, to Kettering Area hospitals. Vacant 22nd September, 1958. Married accommodation available.

Applications, with details of experience and names of 2 referees, to Senior Administrative Medical Officer, 43, Banbury-road, Oxford.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Pathology to Stoke Mandeville Hospital, Aylesbury, Bucks. This is a central laboratory providing a wide range of experience in all branches of Clinical Pathology and recognised for the D.Path. Appointment for 1 year in the first instance, eligible for extension for a second year.

Applications, on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, must reach him by 6th September, 1958.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for the post of HOUSE OFFICER in Accident Service, Radcliffe Infirmary, with effect from 1st October, 1958, for a period of 6 months.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 3 weeks from the date of this advertisement.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for the post of HOUSE OFFICER in the Oxford Eye Hospital, with effect from 1st October, 1958.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 3 weeks from the date of this advertisement.

OXFORD. UNITED OXFORD HOSPITALS. Applica-tions are invited for the post of RESIDENT PATHOLOGIST at the Radcliffe Infirmary and Churchill Hospital, Oxford. The appointment is for 6 months in the first instance, but may be extended to 1 year. The post is graded at Senior House Officer rate £819 10s. p.a., and will be vacant with effect from 1st October, 1958.

Applications, on forms available from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 3 weeks from the date of this advertisement.

OXFORD. WARNEFORD HOSPITAL, WARNEFORD CLINIC, and THE PARK HOSPITAL FOR CHILDREN. SENIOR HOUSE OFFICER required (resident). Warneford Hospital, 72 Beds; Warneford Clinic (de-designated), 78 Beds; and Park Hospital for Children, 30 Beds, with outpatient departments, give comprehensive psychiatric experience and training facilties. Accommodation for single person.

Apply before 12th September to the Physician-Superintendent, Warneford Hospital, with names of 2 referees.

PAISLEY HOSPITALS MATERNITY UNIT (Thornhill AND BARSHAW MATERNITY HOSPITALS). HOUSE SURGEON (obstetrics) required for the above Unit.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. House SURGEONS (general) required for above Infirmary. Posts approved for pre-registration practitioners and F.R.C.S.

Applications to Group Medical Superintendent.

PERTH. COUNTY AND CITY OF PERTH GENERAL HOSPITALS. HOUSE PHYSICIAN or SENIOR HOUSE PHYSICIAN required for Bridge of Earn Hospital. Grade according to experience. Post in junior grade recognised for pre-registration hospital service.

Applications, giving age, qualifications, experience, and names of 2 referees, should be sent to the Group Medical Superintendent, Perth Royal Infirmary, Perth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank-road. HOUSE SURGEON, pre-registration post, vacant immediately.

Apply, with names of 3 referees, also stating age, nationality, qualifications and experience, to the Group Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. SENIOR HOUSE OFFICER in Anæsthetics, vacant immediately. Recognised for the D.A. and F.F.A. R.C.S.

Applications, with names of 3 referees, to be sent to the Group Secretary, 7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS, PLYMOUTH. Central Casualty Department.

RESIDENT SENIOR HOUSE OFFICER in Casualty. Vacant 13th September, 1958. Recognised for the F.R.C.S.

Resident Locum SENIOR HOUSE OFFICER in Casualty, from 1st October to 31st December, 1958.

Applications, with names of 3 referees, to the Group Secretary.

PONTEFRACT AND CASTLEFORD HOSPITAL MAN-AGEMENT COMMITTEE. ANÆSTHETIST (Junior Hospital Medical Officer) required for duties at hospitals throughout the Group. Post resident or non-resident.

Applications, giving details of experience and the names and addresses of 2 referees, to the Group Secretary, Great Northern House, Salter-row, Pontefract.

PONTEFRACT GENERAL INFIRMARY. Resident CASUALTY OFFICER required early September. Graded Senior House Officer. Recognised for Fellowship.

Applications to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of ANÆSTHETIC REGISTRAR in the Portsmouth Group, with main duties at the Royal Portsmouth Hospital. Vacant 1st October, 1958. 6 Consultant Anæsthetists practise in the Group. Post recognised for F.F.A. R.C.S.

Forms of application may be obtained from the Group Secretary, Portsmouth Group Hospital Management Committee, Saint Mary's Hospital, Portsmouth, which should be returned to him duly completed on or before the 28th August, 1958. Canvassing will disqualify. Candidates may visit the above Hospital by arrangement with the Group Secretary.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Portsmouth Hospital (104 orthopædic beds) ORTHOPÆDIC HOUSE OFFICER (pre-registration). Vacant now.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST, St. Mary's Hospital, Milton-road, Portsmouth.

PORT TALBOT GENERAL HOSPITAL, Hospital-road, PORT TALBOT. (85 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (general medicine). Post vacant 1st October, 1958.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, Mid-Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited for the appointment of a Locum HOUSE PHYSICIAN at the above Hospital for a period of not less than 2 weeks.

Applications should be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited from registered medical practitioners for the post of HOUSE OFFICER in Pædiatrics and General Medicine, at the above Hospital. Post tenable for 6 months.

Applications, stating age and experience, with copies of 2 testimonials, to be sent to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. HOUSE OFFICER (surgical) required immediately for busy Surgical Unit. Post recognised for F.R.C.S. qualification and offering excellent experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHDALE. BIRCH HILL HOSPITAL. Senior House OFFICER (pædiatrics), resident. Post vacant in mid-September. Recognised D.C.H.

Apply to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

READING. BATTLE HOSPITAL. (391 Beds.) Reading AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON (pre- or post-registration) required in the Accident and Orthopædic Department. F.R.C.S. recognised. Also casualty duties. Vacant immediately.

Apply, stating age, qualifications with dates, nationality, present post, with copy of recent testimonial, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. Applica-tions are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE PHYSICIAN, vacant 1st September, 1958, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) HOUSE OFFICER (obstetrics) required. Post vacant 16th September, 1958. Recognised for D.Obst.R.C.O.G. The Hospital has 75 maternity beds, a gynæcological ward of 25 Beds, and a premature-baby unit of 8 Cots.

Applications, stating age, &c., to the Secretary by 23rd August, 1958.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) Locum SENIOR HOUSE OFFICER (general medicine) required from 5th September, 1958, for approximately 3 weeks. Post resident.

Applications to the Secretary immediately.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) SENIOR HOUSE OFFICER (general medicine) required. Post resident and vacant mid-September, 1958.

Applications, stating age, &c., with copies of recent testimonials, to reach the Secretary by 4th September, 1958.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEONS (2) required early in September in the General Surgical Unit. Recognised for F.R.C.S. Open to either pre-registration applicants or to fully registered practitioners. This very active Unit of a total of approximately 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidates appointed will be attached to a unit of approximately 60 Beds.

Apply immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. Resi-DENT PATHOLOGIST (Senior House Officer grade). This post, which will become vacant on 1st October, 1958, provides valuable experience by rotation through all departments of this large Group Laboratory and is recognised for the purposes of the Diploma in Pathology. Prospective candidates are invited to visit the laboratory.

Applications should be sent with testimonials or the names of 2 referees, before 18th August, 1958, to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (ophthalmology) required early in October, 1958.

Applications should be addressed immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. Locum SENIOR HOUSE OFFICER in General Surgery required for period of 2 weeks from 8th to 22nd September, 1958, for busy Surgical Unit of 120 Beds.

Apply by letter or telephone to Medical Superintendent (Telephone: Romford 46066).

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. Locum SURGICAL REGISTRAR required from 25th August to 7th September, 1958, for busy Surgical Unit of 120 Beds.

Apply by letter or telephone to Medical Superintendent (Telephone: Romford 46066).

ROTHERHAM HOSPITAL, Doncaster Gate, Rotherham. (161 Beds. Recognised for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics and casualty) required immediately. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st September, 1958, giving age, nationality, qualifications, present and previous appointments ment for (with dates), naming 3 referees.

ROTHERHAM. MOORGATE GENERAL HOSPITAL. (342 Beds, 38 Cots.) Locum SENIOR HOUSE OFFICER (surgery) required.

Applications, stating qualifications, experience, and names of 3 referees, to Secretary to Committee, Fern Bank, Doncaster-road, Rotherham.

RUGBY. HOSPITAL OF ST. CROSS. House Surgeon in General Surgery (pre-registration). Recognised F.R.C.S. Resident.

Applications to Hospital Secretary.

SLOUGH. UPTON HOSPITAL. House Surgeon required in Department of Obstetrics and Gynæcology, to work with part-time Registrar. Post not recognised for D.Obst.R.C.O.G.

Applications, with names of 2 referees, to Secretary.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order for a period of 6 months in each post. Posts open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON to the Obstetric and Gynæcological Department which becomes vacant on 2nd November, 1958, for 6 months. The post is open to pre-registration candidates and is recognised for the Diploma and Membership of the Royal College.

Apply, stating age, nationality, qualifications, experience, and enclose 2 recent testimonials, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Orthopædic Department. Applications are invited for the post of SENIOR RESIDENT HOUSE SURGEON or RESIDENT HOUSE SURGEON, vacant 11th September. Appointment recognised for pre-registration candidates, and also Fellowship regulations. Department has over 50 Beds and large outpatient turnover, dealing with fractures and all types of orthopædic surgery.

Applications, stating age, nationality, qualifications and experience, and naming 2 referees, to the Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in General Surgery at Perth Royal Infirmary (255 Beds). 4-room flat may be made available. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 6th September, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Obstetrics and Gynæcology for duties mainly at Craigtoun Maternity Hospital, St. Andrews, and also at Netherlea Maternity Hospital, Newport. Vacant on 1st November, 1958.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 13th September, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Tuberculosis at Glenlomond Hospital, Kinross.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 13th September, 1958.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance:—

REGISTRAR in Medicine, based at Falkirk and District Royal Infirmary.

REGISTRAR in Surgery, based at Stobhill General Hospital, Glasgow, and with duties on a rotational basis at Falkirk and District Royal Infirmary.

REGISTRAR in E.N.T. Surgery, based at the Southern General Hospital, Glasgow.

REGISTRAR in Pædiatrics, based at Stobhill General Hospital, Glasgow.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 6th September, 1958.

SCUNTHORPE AND DISTRICT WAR MEMORIAL HOSPITAL. (262 Beds.) Applications invited for pre-registration Senior House Officer post of HOUSE PHYSICIAN (1 of 2), vacant middle September, 1958. Modern Hospital with busy department including medicine, pædiatrics, skins and eyes, together with outpatient clinic work. The post offers good experience and residential accommodation.

Application to Group Secretary, Scunthorpe Hospital Management Committee, naming 2 referees.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Immediate vacancies for RESIDENT HOUSE SURGEONS.

(*a*) General surgery and gynæcology—Senior House Officer or pre-registration.

(*b*) General surgery and E.N.T.—pre-registration or Senior House Officer.

Both posts offer splendid opportunities for experience in a modern well-equipped Hospital.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Immediate vacancy for Locum RESIDENT HOUSE SURGEON (Senior House Officer grading).

Applications, naming 2 recent referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum REGISTRAR (obstetrics and gynæcology) required from 26th September, 1958, to 13th October, 1958, inclusive.

Apply Hospital Secretary, Southlands Hospital, as soon as possible. A. V. OAKTON, Group Secretary.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. (Recognised for M.R.C.O.G.) Applications are invited for the resident post of SENIOR HOUSE OFFICER (gynæcology), vacant 15th October, 1958. Duties divided between units in the charge of Professor of Obstetrics and Gynæcology, University of Sheffield, and full-time Consultant respectively.

Applications, stating full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons for reference, should be forwarded to the Group Secretary, Lyndhurst, Nether Edge Hospital, Sheffield, 11, by not later than 31st August, 1958.

SHEFFIELD. CITY GENERAL HOSPITAL. (652 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR required 16th September, 1958, in the Regional Cardiovascular Department at the City General Hospital, Sheffield—a large general hospital having teaching affiliations with the University of Sheffield, a Professorial Medical Unit, and a Department of Thoracic Surgery. Some knowledge of practical cardiology desirable. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st September, 1958, giving age, nationality, qualifications, present and previous appointments (with dates), naming 3 referees.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. Department of Pathology, Area Laboratory. Applications are invited for the appointment of SENIOR HOUSE OFFICER (clinical pathology). Resident accommodation is available and optional. Opportunities for training in morbid anatomy, biochemistry, hæmatology, and bacteriology. The work of this and associated hospitals offers excellent experience to graduates who wish to make pathology their permanent career. The post is recognised for the D.Path.

Apply, giving details of age, qualifications, present and previous appointments (with dates), and the names of 2 persons to whom reference may be made, to the Group Secretary, Nether Edge Hospital, Sheffield, 11.

SHREWSBURY. EYE, EAR AND THROAT HOSPITAL. SENIOR HOUSE OFFICER (E.N.T.). Duties at E.N.T. Hospital (68 Beds) and Copthorne Hospital (168 Beds). Post recognised for the D.L.O. R.C.S. and F.R.C.S. Vacant immediately.

Applications, with copy testimonials, to the Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEON. Vacant immediately. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (274 Beds) AND SOUTHAMPTON GENERAL HOSPITAL (465 Beds). SENIOR HOUSE OFFICER (E.N.T.) required end of August. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work. The Group includes a diagnostic and distributing hearing-aid centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Orthopædic Surgery to fill a vacancy in the approved trainee establishment in the Medway and Gravesend Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 6th September, 1958.

SOUTH ELMSALL. WARDE-ALDAM HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Senior House Officer grade). Warde-Aldam Hospital is a general hospital of 39 Beds (general and orthopædic surgery and E.N.T.). Furnished flat available. Duties mainly in Casualty Department.

Applications, giving details of qualifications and previous experience, with names of 2 referees to be forwarded to the undersigned as soon as possible. D. G. DAVIES, Secretary.

Great Northern House, Salter Row, Pontefract, Yorkshire.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Locum MEDICAL REGISTRAR required on or about 1st September, 1958, pending appointment being filled by the Regional Hospital Board.

Applications immediately to the Secretary.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT ANÆSTHETIST (Senior House Officer grade). Post vacant 1st October, 1958. The appointment is recognised as fulfilling the conditions of the F.F.A. R.C.S. and the D.A.

Applications, stating age, experience, and qualifications, with copies of 2 testimonials, should be sent to the Secretary at the General Hospital, Southend, not later than 28th August, 1958.

SOUTHPORT GENERAL INFIRMARY. (159 Beds. Recognised for pre-registration and F.R.C.S.) HOUSE SURGEON (general surgery and gynæcology). Post vacant now.

Apply, with 2 copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for 1 of the 2 medical firms for duties mainly on the acute wards. Post vacant 18th September, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid-Hertfordshire Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for duties mainly in the Pædiatric Department. Post vacant 28th September, 1958, and tenable for 6 months. Preference given to candidates seeking pre-registration post under the Medical Act, 1950.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS (near), HERTFORDSHIRE. NAPSBURY HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. PSYCHIATRIC REGISTRAR, whole-time, required at above Hospital; a large Mental Hospital with associated outpatient clinics. Some experience in psychiatry desirable. Single accommodation available or possibility of a house on the hospital estate for a married person. Candidates may visit the Hospital by appointment.

Application forms obtainable from, and returnable to, Secretary, Napsbury Hospital Management Committee, Napsbury Hospital, near St. Albans, Herts, by 20th September.

ST. ALBANS (near). NAPSBURY HOSPITAL, near St. ALBANS, HERTFORDSHIRE. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Psychiatry (whole-time) at above Hospital. (2000 Beds and associated outpatient clinics.) Possession of D.P.M. desirable. Experience in Psychiatry essential. Single accommodation available or possibility of house on hospital estate for a married person. Candidates may visit the Hospital by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Napsbury Hospital Management Committee, Napsbury Hospital, near St. Albans, Hertfordshire, by 6th September, 1958.

ST. ASAPH HOSPITAL, St. Asaph, Flintshire. Appointment of HOUSE OFFICER. Duties divided between ophthalmology (16 Beds), E.N.T. (12 Beds), and oral surgery (4 Beds).

Applications, stating age, qualifications and experience, accompanied by 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

ST. ASAPH, FLINTSHIRE. GENERAL HOSPITAL. (201 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at the above Hospital. Post vacant. Married quarters available if required.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl, Flintshire.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time JUNIOR HOSPITAL MEDICAL OFFICER in the Blood Transfusion Service in the South West and South East Metropolitan Regions. Duties include the collection of blood from donors in area covered by South West and South East Metropolitan Regional Hospital Boards and work in the London laboratories at the South London Blood Transfusion Centre, Stanley-road, Sutton, Surrey. Salary scale: £852 10s.–£55–£1182 10s. p.a.

Applications (2 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 6th September, 1958. Applicants may visit Blood Transfusion Centre by local arrangement:

STAFFORD GENERAL INFIRMARY. Senior House OFFICER (anæsthetics) required September. Resident. Post recognised for D.A. examination.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Applications are invited for the pre-registration post of HOUSE OFFICER (medicine).

Applications, with full particulars and copies of 2 testimonials, to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Applications are invited for the post of HOUSE OFFICER (general surgery).

Applications, with copies of 2 testimonials, to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN (general medicine and paediatrics) required. Pre-registration post, vacant very shortly.

Detailed applications, with copy testimonials, to Hospital Secretary, North Staffordshire Royal Infirmary, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN (general medicine and dermatology) required. Pre-registration post. Post vacant very shortly.

Detailed applications, with copy testimonials, to Hospital Secretary, North Staffordshire Royal Infirmary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. Gynæcology Department. SENIOR HOUSE OFFICER required. Post vacant shortly. Recognised for M.R.C.O.G. (surgery). Experience in abnormal obstetrics available, but the work is mainly gynæcological.

Detailed applications, with copy testimonials, to Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post vacant very shortly. Some duties also at Hartshill Orthopædic Hospital.

Detailed applications, with copy testimonials, to Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER in General Surgery required—post vacant very shortly.

Detailed applications, with copy testimonials, to Hospital Secretary, North Staffordshire Royal Infirmary, Stoke-on-Trent.

SWANSEA HOSPITAL, Swansea. (413 Beds.) GlanTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the Surgical Unit of the above Hospital. The post is recognised under the F.R.C.S. (Eng.) regulations.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be forwarded to the Secretary of the Hospital.

T. E. JONES, Group Secretary.

SULLY HOSPITAL, Sully, Glamorganshire. (Thoracic centre of 324 Beds.) SENIOR HOUSE OFFICER (surgical)—applicants primarily interested in general surgery considered. Experience will be gained in investigation and treatment of chest and heart conditions.

Form of application from Group Secretary, 44, Cathedral-road, Cardiff.

SURBITON GENERAL HOSPITAL, Ewell-road, SurbiTON, SURREY.

RESIDENT SENIOR HOUSE OFFICER required. Salary £819 10s. p.a., subject to a deduction at the rate of £150 p.a. in respect of board, lodging and other services. Appointment, suitable for reading for higher qualification, will in the first instance be for a period of 6 months. Successful candidate will work direct with the visiting consultants and will be responsible for ward cases.

RESIDENT JUNIOR HOUSE OFFICER (surgical) required. Pre-registration post. Duties include casualty and outpatients; post provides interesting experience in surgery and medicine under visiting Consultants. Salary and conditions of service in accordance with national scale. Post vacant mid-September.

Applications, stating age, qualifications and nationality, with copies of 2 recent testimonials, to the Administrative Officer, Surbiton General Hospital, Ewell-road, Surbiton, Surrey.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. RESIDENT SENIOR HOUSE OFFICER (Casualty Officer). Post recognised for F.R.C.S. Vacant 27th August.

Applications, stating age, qualifications and experience, with copies of recent testimonials and the names of 2 referees, to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for 2 appointments of SENIOR HOUSE OFFICER as Casualty Officer and Orthopædic House Surgeon at Great Western Hospital, Swindon. Posts recognised by R.C.S. for 6 months of year's training under Fellowship regulations. Work of Accident and Orthopædic Department, associated with Nuffield Orthopædic Centre, Oxford, includes large number of industrial injuries. Salary £819 10s. p.a., less residential emoluments.

Full details and names of 3 referees to Secretary, 7, Okus-road, Swindon, Wilts.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. HOUSE OFFICER (general surgery) required. Pre-registration post recognised for F.R.C.S., vacant now.

Applications, stating age, nationality and qualifications, to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. Applications are invited for the post of SENIOR HOUSE OFFICER (casualty and orthopædic).

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY, near TUNBRIDGE WELLS. TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties on 1st September, 1958. Recognised for F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long- and short-stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WAKEFIELD. CLAYTON HOSPITAL. (207 Beds.) HOUSE SURGEON (general surgery and orthopædics) required at above Hospital. Approved pre-registration appointment.

Application forms obtainable from the Group Secretary, Hospital Management Committee, No. 9 Wakefield A Group, 113, Northgate, Wakefield.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. SENIOR HOUSE OFFICER required for the Orthopædic Department. Salary £819 10s. p.a., £150 p.a. charged for accommodation.

Address written applications, giving full particulars of experience and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. (Regional Thoracic Centre.) Applications invited for positions of SENIOR HOUSE PHYSICIAN and SENIOR HOUSE SURGEON. Salary £819 10s. p.a. £150 p.a. charged for accommodation.

Address written applications, giving full personal particulars, details of experience and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WARRINGTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER (geriatrics), Male or Female, for active Geriatric Units at Whitecross Hospital and Aikin Street Hospital, Warrington. Good clinical experience and study time for higher qualifications. Scale of salary: £819 10s. p.a., less a deduction of £150 p.a. for residential emoluments.

Applications to be forwarded to HENRY L. BOOT, Group Secretary, c/o General Hospital, Warrington, Lancs.

WARRINGTON GENERAL HOSPITAL. (344 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female), graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £819 10s. p.a., less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to HENRY L. BOOT, Group Secretary, Warrington and District Hospital Management Committee, c/o General Hospital, Warrington, Lancs.

WALSALL HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE SURGEON and HOUSE PHYSICIAN required for the Walsall General (Sister Dora) Hospital and the Manor Hospital.

Apply Group Secretary, Walsall General (Sister Dora) Hospital.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (211 Beds.) Applications are invited for the posts of 2 HOUSE SURGEONS at the above Hospital. Pre-registration posts and recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WATFORD. SHRODELLS HOSPITAL. (General Hospital, 366 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Unit. Resident or non-resident. This unit of 180 Beds, under a full-time Consultant Geriatrician, offers excellent clinical experience in diagnosis and treatment of acute and other illnesses in the elderly. Full laboratory and radiological facilities. Adequate time for reading.

Applications, together with copies of not more than 2 testimonials, should reach the Medical Administrator as soon as possible.

WEST BROMWICH AND DISTRICT GENERAL HOSPITAL. (144 Beds.) WEST BROMWICH AND DISTRICT HOSPITALS MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE PHYSICIAN (pre-registration). Post vacant now.

Applications, with 3 recent testimonials, to Group Secretary, West Bromwich and District Hospital Management Committee, Edward-street, West Bromwich.

WESTON-SUPER-MARE GENERAL HOSPITAL. (104 Beds.) Applications are invited from duly qualified medical practitioners for the pre-registration appointment (resident) of HOUSE SURGEON. Immediate vacancy.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee.

WHITEHAVEN HOSPITAL, Cumberland. (122 Beds, plus 31 Beds in Annexe.) HOUSE SURGEON, with orthopædic and casualty duties (recognised pre-registration, Senior House Officer grade if appropriate). Vacant beginning of September.

Detailed applications, with dates, names of 2 referees, to Group Secretary, Workington Infirmary, Cumberland.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. E.N.T. REGISTRAR (resident or non-resident), with main duties at Royal Albert Edward Infirmary, Wigan. Recognised D.L.O.

Applications to Secretary, Wigan Infirmary, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. LEIGH INFIRMARY, LEIGH. SENIOR HOUSE OFFICER required for Casualty Department, with gynæcological and surgical duties at Astley Hospital. Resident post. Vacant now.

Apply Secretary, Knowsley House, Wigan.

WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Anæsthetics (Registrar grade) required at the Royal Hampshire County Hospital, Winchester, with duties in the Alton Group. Post recognised for the F.F.A. R.C.S., and is resident or non-resident.

Forms of application obtainable from Group Secretary, Royal Hampshire County Hospital, Winchester.

WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR required for duties at King Edward VII Hospital and Upton Hospital, resident at the Old Windsor Unit of the former hospital. Preference given to holders of D.Obst.R.C.O.G. Post offers opportunity to gain considerable experience, there being 58 maternity beds and 36 gynæcological beds, with weekly outpatient clinics.

Application forms from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 4th September, 1958.

WOLVERHAMPTON. NEW CROSS HOSPITAL. Pre-registration HOUSE OFFICER in General Surgery. Post recognised for F.R.C.S.

Applications to Hospital Secretary.

WOLVERHAMPTON. NEW CROSS HOSPITAL. (634 Beds.) RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER required (Locum Tenens approximately October–December) for Geriatric Department. Consultant Geriatrician in post with active inpatient treatment and outpatient clinics.

Applications to Group Secretary, The Royal Hospital, Wolverhampton.

WOLVERHAMPTON. NEW CROSS HOSPITAL. (634 Beds.) RESIDENT SENIOR HOUSE OFFICER required for Geriatric Department. Consultant Geriatrician in post with active inpatient treatment and outpatient clinics.

Applications to Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An associated hospital of the Birmingham University Medical School.) HOUSE OFFICER (pre-registration) E.N.T. Department. Post recognised for the D.L.O. and F.R.C.S. examinations. Vacant 10th September.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. Senior HOUSE SURGEON for Thoracic Surgery and Casualty. Post recognised for F.R.C.S. Vacant immediately.

Apply, with 2 testimonials, to Secretary.

WORCESTER ROYAL INFIRMARY. House Surgeon (pre-registration or otherwise) required for General Surgery post at this busy general hospital of 213 Beds. The appointment offers wide and varied experience and is recognised for the F.R.C.S. examinations.

Applications to Hospital Secretary.

WORCESTER ROYAL INFIRMARY. House Surgeon (pre-registration or otherwise) required immediately for Orthopædic Department of this busy general hospital of 213 Beds. The appointment offers wide and varied experience.

Applications to Hospital Secretary.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. WORTHING HOSPITAL (210 Beds), COURTLANDS RECOVERY HOSPITAL (52 Beds). RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER required at Worthing Hospital for work in the Casualty Department with some duties at Courtlands Hospital (mainly surgical). The post is recognised for F.R.C.S. requirements. The appointment will be for a period of 3 years in the first instance subject to extension if desired on both sides. Post vacant 31st August, 1958.

Applications, stating age, qualifications, experience, and nationality, together with copies of 2 recent testimonials, to be forwarded to the Hospital Secretary, Worthing Hospital, Lyndhurst-road, Worthing, Sussex, immediately.

A. V. OAKTON, Group Secretary.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX. (210 Beds. Acute general.) The post of HOUSE SURGEON is vacant immediately.

Applications from either registered medical practitioners or pre-registration candidates, stating age, qualifications, experience, nationality and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary immediately.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

WREXHAM. MAELOR GENERAL HOSPITAL (591 Beds) AND WAR MEMORIAL HOSPITAL, WREXHAM (230 Beds). Applications are invited for HOUSE SURGEON posts at the above Hospitals to commence immediately. The appointments are recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, should be addressed to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, Denbighshire.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of PÆDIATRIC HOUSE PHYSICIAN at the above Hospital, to commence immediately. The appointment is recognised for the D.C.H. and for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, should be addressed to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, Denbighshire.

YORK. COUNTY, CITY, MILITARY (Civilian Wing), AND FULFORD HOSPITALS. (General Hospitals of 266, 256, 60, and 149 Beds respectively, with full Consultant staff.) SENIOR HOUSE OFFICER in Anæsthetics, resident or non-resident, required. Post is recognised for F.F.A. R.C.S. and D.A. Previous experience desirable but not essential. Vacant from 1st October, 1958.

Applications, stating age, nationality, qualifications, experience and names of 2 referees, to Group Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

CHANNEL ISLANDS. JERSEY GENERAL HOSPITAL. (200 Beds—D.A. recognised.) Applications are invited for the position of RESIDENT SENIOR HOUSE OFFICER for anæsthetic duties. The post falls vacant on 25th September, 1958. The appointment is for 12 months in the first instance. Salary £850 p.a., less £125 for residential emoluments.

Applications to be submitted not later than 27th August, 1958, to the President, Public Health Committee, General Hospital, Jersey, C.I.

DUBLIN. DR. STEEVENS' HOSPITAL. Applications are invited from qualified practitioners with surgical experience for the position of SENIOR SURGICAL REGISTRAR to the Hospital. Each candidate should state his age and furnish full particulars of his surgical and medical qualifications and experience. The appointment shall be for 1 year, but may be renewed for a second and third year, and the appointee shall be responsible for intern and extern patients. The salary will be £500 p.a., non-resident.

Applications should reach the undersigned within 10 days from the publication of this advertisement.

WILLIAM KENNEDY, Secretary.

NORTHERN IRELAND HOSPITALS AUTHORITY. SOUTH TYRONE HOSPITAL, DUNGANNON. Applications are invited for the post of SENIOR HOUSE OFFICER (obstetrics and gynæcology) at the South Tyrone Hospital, Dungannon, Co. Tyrone. The salary attaching to the post will be £819 10s. p.a. A charge of £150 p.a. will be made for accommodation and services provided.

Applications, stating age, qualifications, and experience, and the names of 2 persons to whom application may be made for a confidential report, should be sent immediately to the Secretary of the Hospital.

NAIROBI. H.H. THE AGA KHAN PLATINUM JUBILEE HOSPITAL. Applications are invited from registered medical practitioners for the following appointments for this multi-racial Hospital which is due to open on 8th September, 1958. Initially there will be 32 Beds in general medicine, 32 Beds in general surgery, 28 Beds in obstetrics, 20 Beds in pædiatrics, and out-patient and casualty services.

1. RESIDENT HOUSE PHYSICIAN.
2. RESIDENT HOUSE SURGEON.

For these posts the normal period of tenure will be 1 year with a possibility of extension for a further year. The salary for the first year will be £1200 p.a. and for the second year £1250 p.a. Assistance in housing. Candidates for these appointments must have completed pre-registration.

Applications, giving full details of qualifications and experience, and stating the names of 2 referees, should be addressed, not later than 30th August, 1958, to Mr. R. G. A. BEAUMONT, Secretary, Aga Khan Hospital, c/o St. George's Hospital, London, S.W.1.

WEST INDIES. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for the post of REGISTRAR or SENIOR REGISTRAR in Medicine at the above-named Teaching Hospital. Higher qualifications desirable but not essential. The successful candidate will be required to take up duties in early October, 1958. The appointment will be for 1 year in the first instance, subject to renewal. Salary within the scale £900–£100–£1100; £1200–£100–£1500 p.a. according to qualifications and experience. Unfurnished accommodation will be provided, for which 5 % from salary will be deducted. Return passage will be provided for 1 person only.

Applications, stating age, nationality, qualifications and details of experience, together with the names and addresses of 3 referees or copies of testimonials, should be sent not later than 10th September, 1958, to the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona, Jamaica, The West Indies, from whom further information may be obtained.

Public Appointments

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointments as Appointed Factory Doctors are vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
BLANDFORD ..	DORSET ..	6TH SEPTEMBER, 1958
HALESOWEN ..	WORCESTER ..	6TH SEPTEMBER, 1958
HISTON	CAMBRIDGE ..	6TH SEPTEMBER, 1958

BIRMINGHAM. CITY OF BIRMINGHAM EDUCATION COMMITTEE. Applications are invited from registered medical practitioners (Men or Women) for appointment as SCHOOL MEDICAL OFFICER in the School Health Service. The possession of a D.P.H. or D.C.H. will be an advantage. Salary in accordance with Whitley Council scale of £1050–£50–£1200–£55–£1475 p.a. Appointment is subject to the appropriate superannuation Act and to the passing of a medical examination.

Forms of application obtainable from the undersigned (stamped addressed envelope) must be returned not later than Monday, 1st September. Canvassing disqualifies.

E. L. RUSSELL, Chief Education Officer.

School Health Service,
102, Edmund-street, Birmingham, 3.

DUDLEY. COUNTY BOROUGH OF DUDLEY. Applications are invited from registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER; duties in connection with the Maternity and Child Welfare and School Health Services. Salary £1050–£1475 p.a.; car allowance.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should reach the undersigned not later than Saturday, 20th September, 1958.

P. D. WADSWORTH, Town Clerk.

Council House, Dudley, 9th August, 1958.

DUMFRIES BORSTAL INSTITUTION. Medical Officer (part-time). Work includes visits of approximately 1 half-hour daily, except Sundays; emergency calls; occasional hygiene inspections and reports. Medical Officer must supply deputy when he is not available. Salary £280 p.a. (not superannuable).

Application forms from Director of Prison and Borstal Services, Government Office Buildings, Broomhouse-drive, Edinburgh, 11.

MANCHESTER EDUCATION COMMITTEE. Deputy SENIOR MEDICAL OFFICER required for work in the School Health Service. Salary £1290–£50–£1440–£55–£1605 p.a. The duties will include administration and the ascertainment of handicapped pupils. Previous experience in a health service is essential. D.P.H. or D.C.H. desirable.

Application forms and particulars (stamped, addressed envelope) from Chief Education Officer, P.O. Box 480, Manchester, 3, returnable to the Town Clerk, Town Hall, Manchester, 2, by 13th September, 1958. Envelope to be endorsed School Health Medical Officer.

MIDDLESEX COUNTY COUNCIL. County Health Department. SENIOR ASSISTANT MEDICAL OFFICER (Male) required initially in Area 8 (Hayes/Harlington, Ruislip-Northwood, Uxbridge, Yiewsley/West Drayton). Whole-time for administration and clinical work. Approval by Minister of Education for ascertainment of educationally subnormal children desirable. Diploma in Public or Child Health advantage. Salary £1370–£50(2)–£55(4)–£1740 p.a. inclusive. Established, subject to medical assessment and prescribed conditions.

Apply, stating age, qualifications, experience and 2 referees, to Area Medical Officer, Local County Offices, High-street, Uxbridge, by 12th September, 1958 (quote Y.22L.) Canvassing disqualifies.

MIDDLESEX COUNTY COUNCIL. County Health DEPARTMENT. ASSISTANT MEDICAL OFFICER (whole-time) required initially in Area No. 3 (Hornsey and Tottenham). Duties concerned with supervision of health of mothers and young children and School Health Service. Diploma in Public Health or Diploma of Royal College of Obstetrics and Gynæcology essential. Salary £1050–£50(3)–£55(5)–£1475 p.a., inclusive. Established. Subject to medical assessment and prescribed conditions.

Apply, stating age, qualifications, experience, and names of 2 referees, to Area Medical Officer, Local County Offices, Somerset-road, N.17, by 5th September, 1958. (Quote Y.24 L.) Canvassing disqualifies.

NATIONAL COAL BOARD. NORTH EASTERN DIVISION require ASSISTANT AREA MEDICAL OFFICER in No. 2 (Doncaster) Area. Experience of preventive and industrial medicine and a knowledge of the Coalmining Industry an advantage. Duties will include underground visits to collieries. Salary £1250–£1700, according to qualifications and experience.

Apply, giving full details, and names of 2 referees, to the Area Staff Manager, St. George's, Thorne-road, Doncaster, by 1st September, 1958.

NORTH WESTERN GAS BOARD. Applications are invited for the pensionable appointment of MEDICAL OFFICER. The successful candidate will work under the direction of the Chief Medical Officer. The commencing salary will be £1600 p.a.

Further details may be obtained on application. Detailed applications, giving the names of 2 referees, should reach the Secretary, North Western Gas Board, 60, Whitworth-street, Manchester, 1, within 21 days.

NOTTINGHAM. CITY OF NOTTINGHAM. Health SERVICES. Applications invited for appointment of ASSISTANT MEDICAL OFFICER OF HEALTH for general duties including maternal and child health and immunisation. Possession of the D.P.H. an advantage. Post superannuable subject to medical examination. Salary £1050–£1475 p.a. Commencing salary according to local government experience.

Application forms to be obtained from Medical Officer of Health, Huntingdon-street, Nottingham, and to be returned to him by 2nd September, 1958. T. J. OWEN, Town Clerk.

SHEFFIELD. CITY OF SHEFFIELD. Applications are invited for the appointment of SENIOR SCHOOL MEDICAL OFFICER, who will be the Senior Officer in charge of the School Medical Service (the Medical Officer of Health for the City being Principal School Medical Officer). The salary will be £1520 p.a., rising by 1 increment of £50 and 7 increments of £55 to a maximum of £1955 p.a., in accordance with the scale prescribed for Senior Medical Officers by the Whitley Council for Health Services. The post is designated as an established post under the Local Government Superannuation Acts, and the successful candidate will be required to pass a medical examination.

Forms of application and particulars of the appointment may be obtained from the undersigned and should be returned not later than 13th September, 1958. Canvassing will disqualify.

JOHN HEYS, Town Clerk.

Town Hall, Sheffield, 1.

STOKE-ON-TRENT. CITY OF STOKE-ON-TRENT. PUBLIC HEALTH DEPARTMENT. Applications are invited from qualified medical practitioners for the post of ASSISTANT MEDICAL OFFICER on the Maternity and Child Welfare Services. Candidates should have experience in diseases of children and obstetrics. Opportunity will be given for hospital contact with both pædiatrics and obstetrics. The possession of a D.P.H., D.C.H., or D.Obst.R.C.O.G. will be considered an additional qualification. The salary will be at the rate recommended by the Whitley Council, with starting salary according to experience. The appointment will be subject to the provisions of the National Health Services (superannuation) regulations, 1947, and the successful candidate will be required to pass a medical examination.

Forms of application may be obtained from the Medical Officer of Health, Public Health Department, Glebe-street, Stoke-on-Trent, and should be returned, accompanied by copies of not more than 3 recent testimonials.

HARRY TAYLOR, Town Clerk.

SUTTON AND CHEAM. BOROUGH OF SUTTON AND CHEAM. URBAN DISTRICT OF BANSTEAD. Applications are invited from registered and appropriately qualified medical practitioners for the joint appointment of MEDICAL OFFICER OF HEALTH for the Borough of Sutton and Cheam and the Urban District of Banstead. Candidates must not be more than 45 years of age. The person appointed will be required to perform all the duties imposed on a Medical Officer of Health under the relevant Acts and Orders and to carry out all such duties as the respective Councils may from time to time direct; must not engage in private practice; and must devote his whole time to the duties of the office. The appointment will be subject to the Local Government Superannuation Acts, 1937 and 1953, and the successful candidate will be required to pass a medical examination. The person appointed will be required to take up his duties on 1st January, 1959, and the appointment will be subject to 3 months' notice on either side. Office accommodation, clerical assistance, and stationery will be provided by the employing authorities. The salary will be in accordance with the Medical Whitley Council Committee C scale for a total population not exceeding 150,000, and the commencing salary will be fixed at a point between £2070 and £2395 p.a., according to age, qualifications, and experience, plus £100 in respect of the joint appointment, rising by 4 annual increments of £55 and 1 of £50. Whitley Council conditions will apply. A car allowance will be paid. Applicants should disclose whether in their knowledge they are related to any member of, or the holder of any senior office under, the Sutton and Cheam Borough Council or the Banstead Urban District Council. Canvassing in any form, either directly or indirectly, will be a disqualification.

Applications, giving full details, and the names of 3 persons to whom reference can be made, must be received by the Town Clerk, Municipal Offices, Sutton, Surrey, in a sealed envelope endorsed "Medical Officer of Health", not later than the 6th day of September, 1958.

A. PRIESTLEY,
Town Clerk of Sutton and Cheam Borough Council.
F. L. SHAW,
Clerk of Banstead Urban District Council.

13th August, 1958.

GOVERNMENT OF BAHRAIN. Medical Department, BAHRAIN, PERSIAN GULF. The Government of Bahrain invites applications from British lady doctors (age 35–45 years) for the post of ASSISTANT to the Senior Lady Medical Officer. Duties will be general and administrative in a new women's hospital of 210 Beds and other medical units. Preference will be given to an M.R.C.O.G. and interest in midwifery. Salary will range from £1800 to £2520 a year (R.2000 to R.2800 a month) depending on experience and degrees. Annual increments of £90. No allowances. No income-tax, provident fund or pension. Free quarters with hard furniture and transport. Agreement for 2 years, renewable, with 5 months' home leave on full pay and air tourist passages. Appointment from November, 1958.

Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience, and quote M3C/44916/LD and enclose photograph.

YORK, CITY OF YORK. Applications are invited for the post of Temporary MEDICAL OFFICER for 2 years in the City of York Health Department, to release a permanent officer for work with the World Health Organisation. The successful applicant will work either as Deputy Medical Officer of Health or as Assistant for Maternity and Child Welfare, according to qualifications and experience. Appropriate Whitley Council salary.

Further details on request.

C. B. CRANE, Medical Officer of Health.

9, St. Leonard's-place, York.

GOVERNMENT OF BARBADOS. Medical Registrar, with qualifications registrable in United Kingdom, and either postgraduate qualification or at least 4 years' experience in hospital ward, outpatient clinic or special department, required for General Hospital to assist Specialist Physician. May be required to do postmortems, medical outpatients (new cases), blood organisation, emergency and casualty duties. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of pensionable service, or agreement for 3 years (in which case employer's share of approved superannuation contributions will be paid). Salary scale £1300–£1500 p.a. Income-tax at local rates. Furnished quarters provided at rental of 6% of salary. Free passages on appointment for Officer, wife, and family up to maximum cost of £400 each way. Permanent officer granted leave passages for himself and wife only. Climate healthy. Educational facilities available.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD 117/28/015).

GOVERNMENT OF BRITISH GUIANA. Obstetrician and GYNÆCOLOGIST required to be in charge of Wards and Clinics of the Georgetown Hospital, to instruct Junior Medical Officers and Nurses in Obstetrics and undertake other duties as may be assigned by Director of Medical Services. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service; or on contract for 3 years' resident service with gratuity (taxable) of 22½% of salary for each 3 months' service. Candidates from National Health Service may retain superannuation rights during service abroad (up to 6 years) and receive gratuity of 20% of salary on leaving overseas employment. Salary £1800 a year, plus allowance of £250 a year in lieu of consultation fees. No private practice. Income-tax at local rates. Government quarters provided or allowance of £100 a year in lieu. Generous leave. Free passages for officer, wife, and children under 18, not exceeding 5 persons in all. Assisted passages on leave. Candidates must possess qualifications registrable in United Kingdom and M.R.C.O.G.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD 117/30/021).

GOVERNMENT OF NORTHERN RHODESIA. Male MEDICAL OFFICERS possessing medical qualifications registrable in United Kingdom required for Pneumoconiosis Medical and Research Bureau. Duties include clinical and radiological examination of miners (European and African). Officer will be stationed at Kitwe and will work under the supervision of Chairman (a Medical Specialist) of the Bureau. Kitwe is a town of considerable size with agreeable climate and many social amenities. Post offers excellent opportunity for experience in diseases of chest and research in pneumoconiosis. Appointment on permanent basis with pension, or short-term contract with gratuity (taxable). Candidates from National Health Service may retain superannuation rights (up to 6 years) and receive gratuity (taxable) of 20% of aggregate of salary at end of engagement. Salary scale £1315 to £2130 a year; starting salary depending upon age and experience. Pension for permanent appointment at rate of 1/600th of final pensionable emoluments for each completed month of service. Gratuity for contract appointment £37 10s. for each completed 3 months of service. Free passages provided in both directions for officer and wife, and assisted passages for children. Housing available, and married candidates may take family. Annual leave permissible; generous home leave granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/3/02).

SOMALILAND PROTECTORATE. Medical Officer with qualifications registrable in United Kingdom required for general medical, surgical, and public health duties. Should be capable of simple emergency surgery and willing to train Somali nursing staff. Appointment can be made on permanent basis with pension (non-contributory) at rate of 1/600th of final pensionable emoluments for each completed month of service; or on short-term contract with gratuity. "R" practitioners, i.e., practitioners liable for call-up under the National Service Acts, may apply, and, if appointed, will be granted indefinite deferment of call-up on completion of a minimum of 2 tours' service. Salary scale from £1284 to £2115 a year, starting salary determined by age and experience. Furnished quarters at low rental. Free passages in both directions and on leave for officer, wife, and up to 3 children under 18 years. No income tax. Education allowance payable for up to 3 children aged 6–18 years: on first child £120 p.a., second child £96, and third £72. Normal tour of service 18 months, after which generous home leave granted. Local leave also granted.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD 117/5/01).

TRISTAN DA CUNHA. Doctor required for general medical duties on South Atlantic Island of Tristan da Cunha. Knowledge of dentistry an asset. Appointment would be on agreement for approximately 2 years in first instance. Salary £1200 a year. Free quarters provided equipped with heavy furniture and refrigerator for which a small rental will be charged. Free return passages provided for Officer, wife, and up to 3 children under 18 years of age. Generous home leave. Private practice not permitted. Special importance will be attached to suitability of personal qualities for service in this small, remote, but distinctive community. Candidates must possess medical qualifications registrable in the United Kingdom.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/170/02).

General Practice

For an **Executive Council post** *(England and Wales) apply on form* E.C.16A *obtainable from the council. Mark envelope "Vacancy."*

COUNTY OF INVERNESS EXECUTIVE COUNCIL. Applications are invited from registered medical practitioners to fill a VACANCY at Arisaig, Inverness-shire. The number of list at 1st July, 1958, was 560. There is substantial mileage payment. There is also an inducement payment. A house owned by the Council is available.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, should be sent, not later than 30th August, 1958, to the undersigned, from whom particulars can be obtained.

JAMES WEIR, Clerk to the Council.

17, Queensgate, Inverness.

AMENDED ADVERTISEMENT

EXECUTIVE COUNCIL FOR THE COUNTY OF SURREY. BOROUGH OF MITCHAM. Applications invited for VACANCY which will arise on 1st November, 1958, in above Borough ("Intermediate"). List about 3300 including approximately 800 in London and Croydon. Retiring doctor's residence and surgery available for purchase. Applications on Form E.C.16A to reach the undersigned not later than 3rd September, 1958.

S. H. BENNETT,
Clerk of the Council, Surrey Executive Council.

187, Ewell-road, Surbiton, Surrey.

LLAY, near WREXHAM, DENBIGHSHIRE. Applications invited for VACANCY (rural) due to resignation. List approximately 850. Residence may be available. Apply on Form E.C.16A not later than 30th August, 1958, to TUDOR WILLIAMS, F.C.I.I., Clerk of Denbighshire and Flintshire Executive Council, 11, Grosvenor-road, Wrexham.

WELLING, KENT. Applications invited for Vacancy (urban). List at present approximately 2000, including approximately 50 patients who reside in London. Residence and surgery available. The practice has been in the hands of a lady doctor for 25 years. Apply on Form E.C.16A before 6th September, 1958, to the undersigned. F. E. MILES, Clerk,
Kent and Canterbury Executive Council.

11, Station-road, Maidstone.

Married Assistant required by Partnership of 3 Doctors in a West Midland town. Possible view. Car owner. Start 1st October. Salary and allowances by arrangement.—Address, No. 421, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Hospital Services: Non-Medical Appointments

DUMFRIES. CRICHTON ROYAL. Applications are invited for the post of CLINICAL PSYCHOLOGIST at the above Hospital. A good honours degree in psychology is essential. Previous clinical experience is not expected, as the Hospital has a recognised Training Unit. The salary will be in accordance with the statutory rates for the National Health Service.

Applications should be addressed in the first instance to JOHN C. RAVEN, M.SC., Crichton Royal Department of Psychological Research, 20, Castle-street, Dumfries.

Miscellaneous

A well-known British Ethical Pharmaceutical Company invites applications from physicians for the position of Medical Liaison Officer. The principal duties comprise initiation and supervision of clinical work on new research compounds and established products in the therapeutic and nutritional fields, involving liaison with Consultants and Clinicians in hospitals, research establishments, &c. Based on London, a considerable amount of travelling at home, and occasionally abroad, will be necessary. This is a full-time, progressive appointment, and the company operates an excellent non-contributory pension scheme. Salary according to qualifications and experience, but not less than £1500 p.a. Candidates, preferably aged 30–40, should write, giving full details, to the Managing Director, Address, No. 419, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Dr. Barnardo's Homes. Experienced Christian Male Doctor required from 1st October, 1958, as Medical Superintendent at The Village Home, Barkingside. Experience with physically handicapped children desirable. Salary scale £1100–£1500. Apply Chief Medical Officer, 18, Stepney Causeway, London, E.1.

London, S.W.16 (near Croydon). Freehold detached property. Converted professional purposes ground floor. 6-roomed self-contained flat above. Main road. Large garden. £5000.—Write Box No. 423, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Provincial private mental hospital for sale as a going concern. Old-established and prosperous. Freehold. Modernised and in first-class condition. Mortgage available.—Address, No. 424, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

Sale of medical equipment and Rolls-Royce, owner-driver, sports saloon, 1938. X-ray diagnostic, electrocardiography, surgical instruments, &c., &c.—Address, No. 422, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

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3. **non-alkalising**
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Prodexin tablets sucked regularly provide continuous buffering of gastric acid at about *p*H 4, in the face of widely differing acidities and irrespective of the rate of emptying of the stomach. Prodexin does not make the stomach alkaline and does not stimulate compensatory secretion of acid. The tablets are pleasant to take, non-gritty and non-constipating.

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INFANTS—*Less than one year old, one 0.25G. tablet twice a day*

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